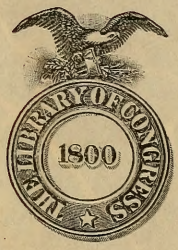

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MONEY

IN

BROILERS AND SQUABS,

TOGETHER WITH

SPECIAL CHAPTERS ON TURKEY AND GUINEA BROILERS AND GREEN DUCKLINGS AND GEESE FOR MARKET.

THE EXPERIENCES OF PRACTICAL MEN.

BY MICHAEL K. BOYER.

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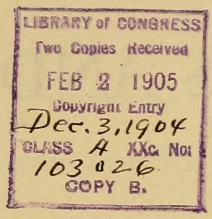

INTRODUCTORY.

An introduction is hardly needed for this work. The subject matter is of such a nature that its worth is readily understood. The writer aims to place in a concise manner such information as will be of value to both the novice and the veteran in the production of choice, young, tender carcasses for market, and in order to more completely handle the subject, embraces broilers, squab-pigeons, green ducklings and geese, and turkey and Guinea broilers.

That much good will come from this effort, is the earnest hope of

THE AUTHOR.

Hammonton, N. J., October 1st, 1904.

MICHAEL K. BOYER.
Plate No. 1.

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MONEY

IN

BROILERS AND SQUABS.

CHAPTER I.

A Small Beginning, and How the Broiler Industry Grew with the Advance made in Improved Machinery, Improved Ideas, and Improved Facilities Generally—Pointers Showing why so Many Failures in the Pioneer Days.

Some years ago a broiler boom struck the country; but, like all unhealthy booms, the bottom soon dropped out of it. It was well that it did. The failures paved the way for better success—better appliances, better methods and a better market.

Why the failures? Too many concerns heeded the false advice to locate on "town lots", and to " buy the eggs". The authority of those days was not born of experience, and in consequence a false light was presented. No wonder they failed. Crowded on the rear of a town lot, and equipped with crude material and crude tools, it is a wonder that they ever raised a chicken for market. But the greatest loss came to those who were compelled to buy their eggs for hatching. They gathered them from everywhere. Teams would go among the farmers and buy what they had—all varieties, shapes and conditions. The majority of these eggs were more or less chilled. The only plants that made a success were those which either kept their own breeding stock, or had some egg farm supply them direct.

Hammonton deserves the distinction of being the birthplace of the broiler industry. She laid the foundation, and her many failures have been the object lessons from which more careful and better equipped parties in other parts of the country profited. The writer came to Hammonton when a score or more broiler plants were in operation. To-day the number is considerably less, but the quality has greatly improved.

What did Hammonton's failures teach?

First. We must have one breed or one systematic cross, and never rely upon eggs purchased just any and everywhere.

Second. The "town lot" scheme is a dead failure.

Third. We must have improved machinery, and the number of good incubators and brooders on the market to-day have worked wonders in this particular.

Fourth. We must have capital. No business will thrive without the investment of money, no matter how experienced the man may be.

In short, a man to successfully raise broilers must have capital, patience, experience, ample territory, good stock, improved machinery, and the necessary facilities. In the matter of houses there have been wonderful improvements made.

But, with all this knowledge, and all these appliances, we do not have faith in **exclusive** broiler plants. We have witnessed the collapse of too many. As an adjunct to some other branch, it can be made very profitable. Combine it with egg farming, squab raising, duck culture, fruit growing, or general trucking, and there will be a year round income.

There is no branch of the poultry business that calls for such careful, patient work as does broiler raising. It requires constant application; it demands close attention every day of the week, and from early to late. That kind of work will quickly tire those who do not possess grit. Pluck and grit are two valuable ingredients in the broiler raiser's formulae for success. We never knew a man to succeed who was an easy victim of the "blues."

It is a good thing that this work is so exacting, for were it an easy, happy-go-lucky job, how long would it be before we would be overrun with broiler establishments, and the price of that commodity would not bring a profit in market.

As it is none but the earnest, faithful workers succeed and they fully deserve the reward they reap.

The pioneers in the broiler business were men of limited capital, crude facilities and practically no experience. When improved incubators and brooding systems were placed upon the market, another class became interested—men of capital. The latter erected large houses, equipped everything on the wholesale plan, went at it on a big scale, and hired an "expert" to run the business. With what result? A total collapse. The expert was working for his stated salary; he was not economical in his expense account, and became extravagant beyond measure.

"There's plenty of money back of it" became the excuse for "making a good thing out of it." The loss of the capitalist did not fall so heavily upon him as it did upon the poor fellow who had invested every dollar he had in this world, and who besides was as deficient of practical ideas as he was of cold cash.

To be brief, the cause of the failures in Hammonton—and they might also be extended to beginners in general—are:

Debt. They either borrowed the capital to secure the plant, or they had to ask credit for the feed and running expenses, as they invested every dollar in making the start.

Stale and Chilled Eggs. This resulted from their custom of buying up eggs among farmers. As they paid a few cents more

per dozen, than the market price, farmers "saved them up", and as the average farmer pays little or no attention to the age and protection of his eggs, a bigger part of them were stale and chilled when they reached the incubator.

Carelessness in attending to the business; "putting off until to-morrow what should have been done to-day."

Inexperience. Without knowledge a man does not know how to treat matters so that they will give the best results; neither does he know how to meet trouble when it comes. The more experienced a man becomes, the more easy will be the sailing. It is a fact that nine-tenths of the troubles that fall to the lot of the novice, do not come to the expert, for experience has taught the latter how to avoid them. As one becomes more learned in this art, he realizes the truth of the maxim: "Prevention is better than cure."

Overcrowding. This is a fault too many are guilty of. It is dangerous ground to tread upon. Overcrowding teaches vices among stock; it causes the fowls to overheat at night; it means crushing out the life of the weaker chicks. In short, it means continual trouble. It must be avoided by all means. Small flocks are always the most profitable.

Rented Ground. It is a mistake to rent the land upon which you erect your buildings. No man wishes to risk good substantial buildings upon the ground that does not belong to him. Even if he had a provision in his agreement to be allowed to move the buildings at any time he wishes, the cost of moving, and the racking of the houses, would be too great for profit. The result is, just any sort of a building is provided, a serious handicap to the success of the business.

Lack of System. This is too often found on the average plant of the beginner. He wastes time, feed, room and everything necessary for good results. Work systematically done will bear good fruit. Helter-skelter methods never benefited any vocation, and it certainly cannot the broiler industry. Make good plans and good rules, and follow them out to the letter.

Too Little Capital. What a common failing. It takes money to make money. The expense of a plant should be met, not with borrowed capital, but with cash that belongs to no one but the party starting. There should be sufficient left for fully a year's operation, so that feed bills, family expenses, and miscellaneous items can be met. This is the only safe beginning to make. Even an expert will profit nothing if he has not the cash to encourage his work. The best physician in the world cannot treat his patients if deprived of his medicines. So with the broiler raiser.

That Tired Feeling. This condition has given serious blows to several plants within the knowledge of the writer. "That tired feeling" is akin to laziness. The man who is not ambitious, energetic and wide awake would fail at gathering gold nuggets. The repetition of each day's work; the sameness of that work, has been the leak that has too often sunk the most promising enterprises.

Neglect of small details comes to the man who puts them off because he feels lazy to-day and "to-morrow will do just as well." Take all the rest you need, but let there be time for work and a time for rest. Do business during business hours.

We could still further enumerate, but we have said enough to point out why the failures in Hammonton, and why the failures in this line generally.

One lesson taught in particular by the experiences of Hammonton, was that no broiler plant can be operated by an inexperienced person. It is not reasonable to suppose that any business can be run by "greenhorns." Operating incubators and brooders calls for knowledge, born of experience. Books are invaluable in pointing out the way, but it remains for us to work the problem. Experience is often a dear teacher, but it is a valuable and thorough instructor. For that reason it is necessary to begin in a small way and gradually work to the front.

The early broiler raisers of Hammonton realized as much as eighty cents a pound for plump broilers weighing about a pound and a half each. We do not get such prices at the present day. At that time they were considered a luxury, and only the rich could enjoy them. Broilers are now offered at such figures that all can have a taste of them. The demand is growing, but I do not believe we will ever reach the high prices of twenty or more years ago.

With all that, however, I believe the broiler raisers of to-day are making more money with the present prices, than they realized at any time before. In the days of eighty-cents-a-pound the incubators were crude affairs, large boxes with galvanized iron tanks in them, which were kept full of boiling hot water during incubation. Each day a certain amount of this water had to be drawn off, and an equal amount of hot boiling water added. This regulated the temperature. The eggs were kept in a large drawer in the machine, and when the operator wished to know the temperature he had to pull open this drawer, thus giving a chill to the eggs, as well as greatly reduce the temperature. Ventilation in the machine was very poorly furnished, about the best provision was by pipes in the bottom of the machine, which took in air near the floor of the incubator room, and conveyed it to the egg chamber. Moisture was handled by means of wet sponges, and this was liberally given. We saw hatches where the chicks looked as if they had been drawn through a stream of water. Once in a while hatches would come off on time, but the majority of them were a week or so late, producing weak, puny stock. The brooders were still worse—crude boxes with a strong bottom heat furnished by lamps.

July 1st, 1903, we furnished Farm-Poultry, of Boston, Mass., with facts of early-day work, and from this article we make the following extracts:

"Poorly hatched and poorly brooded chicks furnished good grounds for the belief that artificially hatched chickens were not as strong and vigorous as those brought out under the hen. And they were not.

"But matters have greatly changed of late years. We have incubators and brooders that are reliable, safe and practical. Some years ago there were a number of poorly constructed makes upon the market; in fact, they were machines that did the cause more harm than good, but the advent of improved machinery—invented and built by practical poultrymen—have crowded to the wall inferior makes. We, too, have better brooders and brooding systems now than we had a half a dozen years ago, but there still remains room for considerable improvement in this direction.

"With this improvement of the machinery, with a better knowledge of what to feed, and how to feed it, and with a better system of marketing, it costs a third, if not a half, less to raise a broiler now than it did in the days when eighty cents a pound was realized. The hatches are better because of our improved facili-

Plate No. 2.—EGG YOLK—72 hours incubation

ties, and the mortality is less for the reason that we better understand the needs of the little chick from the time it leaves the shell until it falls a prey to the man who prepares it for market.

"Hence, at forty cents a pound our poultrymen to-day are realizing as much profit as they did in the days of double the amount."

The broiler business offers inducements to the man who has pluck, energy and cash. He must not be an impatient, easily-discouraged fellow. He must be on the constant lookout, and always aim to nip trouble in the bud. He must not undertake too much —must begin with a small plant and gradually build it up to what he considers an ideal one. A man should not undertake any business he cannot give the best of personal attention. Hire men to **assist** you, and not to manage; do that part yourself. The business requires an overseer with brains more than with muscle.

As we have already hinted, an exclusive broiler farm is, as

a rule, a failure. Too much depends upon it. As an adjunct it is profitable. We never heard of an exclusive broiler farm that was successful, but A. F. Hunter, of the Reliable Poultry Journal, Quincy, Illinois, unearthed one at Yardley, Pennsylvania, and which had been in operation for fifteen years. It occupied but an acre of ground, and on the day of his visit, Mr. Hunter saw about three thousand chicks, ranging from a day to six weeks of age. The time of the year was September 14th. According to the table of shipments and returns, the market price reached fifty cents per pound in April, and dropped to twenty cents in August. A drop of ten cents a pound is given from April down. From 9,000 eggs placed in the incubators, 4,500 chicks were raised, either to market size or sold as half-grown pullets, or were there as well-matured pullets.

Mr. T., the proprietor of the broiler farm referred to, places the cost of a two pound broiler at twenty-five cents. He counts two eggs to produce it, the cost of which is five cents; labor, seven cents; feed, eight cents; picking, five cents.

Fifteen years ago the author of this book made a careful investigation of the cost of producing a broiler of two pounds in weight, and found it cost an average of fifteen cents per pound. Also that, as a rule, we could rely upon but fifty per cent results from our eggs. Mr. T.—fifteen years after that statement of ours was published—practically endorses it. He produces the two pound broiler for twenty-five cents; we could not for less than thirty cents, but Mr. T. is buying his feed in ton lots, while we paid the hundredweight price. That difference in price really represents the difference in cost of feed.

Twelve weeks should be the two-pound broiler age. If the chicks are from hardy parents, and are properly hatched, brooded and fed, and also are from a distinct breed or cross, they can be grown ready for market by that time. One pound broilers can be had in from six to eight weeks; one and a half pounds in from eight to ten weeks.

The best broilers come from our American breeds—Plymouth Rocks, Wyandottes and Rhode Island Reds. The most popular variety of the American class is conceded to be the White Wyandottes. They make a plump broiler, are good growers, and furnish neat and attractive carcasses.

CHAPTER II.

A Miscellaneous Batch of Pointers Invaluable to Broiler Raisers.

Will it pay to raise broilers the year 'round? Much depends upon the markets. In South Jersey, for instance, there is a constant demand—New York and Philadelphia buying them during the regular season, and Atlantic City, Ocean City, Cape May and other seaside resorts calling for them in summer. Ordinarily, however, where there are no nearby resorts, it is hardly profitable to raise them outside of the season, which is January to June—the market season runs from April to and including August.

The term "Philadelphia Broilers" is merely a trade name, and does not signify that the birds were grown in or about Philadelphia. Nearly all of the product that sell under that name, come from New Jersey, and some from the eastern part of Pennsylvania. The reputation for Philadelphia Broilers has been well earned, they being superior in both appearance and condition, and quickly find a sale.

There is nothing that will help the demand for a product so readily as a good reputation. The only way to establish it is to advertise, and we know of no better method than by tagging every carcass. A small, neat tag can be printed, on which should be given the name and address of the farm. It will teach customers to call for your goods, and will eventually lead to better prices.

Beginners very often make the mistake of giving their broilers range. They do not want the exercise that young stock intended for breeding purposes need. You can never get the plump, juicy, tender broiler in any other way than by confining them in limited runs, and feeding the choicest food.

A broiler must not weigh over two pounds dressed. If it does, it enters the Spring chicken class. The market calls more for one-and-a-half pound broilers than it does any other weight. Generally, March demands a one-and-a-quarter pound; April, one-and-a-half pound; May, one-and-a-quarter to two pounds.

An attractive broiler will have a full breast, a broad back, and a plump body. Never market big combed or feathered-leg broilers. Superior broilers are quick grown.

Arthur G. Duston, who at one time was the most extensive broiler raiser in New England, prefers the White Wyandotte to any other breed for broilers. Even for light weights he found the other breeds unsatisfactory. He finds the breed will stand forcing uncommonly well.

A gilt-edged broiler should have a short head; a broad, deep, full breast; a small rose or pea comb; weight from one-and-a-half to two pounds; short, deep, well-rounded body; short and broad back, at the shoulders; rich, yellow skin, free from pin feathers; short and stout thighs, short and stout shanks, free from feathers and bright yellow in color. Note how well the White Wyandotte fits that standard.

A fat chicken is always desirable, and a full plump body and limbs will go a long way toward finding a customer. Most of the chickens sent to market are lean and lanky.

Broilers hatched in October, November and December, will come in for good prices in January, February and March, in many sections of the country. It is the wise man who investigates his market requirements before he starts operations.

To have superior broilers, we must take good care of the parent stock. Overfat parents produce weak chicks; ailing parents give us sickly chicks; while strong, vigorous parents give us the ideal chicks that can be profitably grown as broilers.

The American Stock-Keeper says: When mating for flesh, the cock should never be even moderately long-legged, unless the hen is usually short-legged, for the cockerels from such a sire will be gawky and stilty in form when sent to market at an immature age. His breast should be broad, full and round, and his back broad.

Broilers shrink about a half pound each when dressed, so in catching birds for market, due allowance must be made. A bird weighing two pounds live, will be about one-and-a-half pounds dressed.

The broiler market practically begins in February, improves in March, and reaches the highest point in April. Then it gradually declines, by August it is very fluctuating. During October, November and December there is very little demand for broilers.

At one time it was feared that the refrigerator industry would cripple the fresh-broiler trade, but the public was not so easily duped. The refrigerator trade allowed speculators to palm off frozen and thawed-out stock, to an unsuspecting public, as fresh, but refrigerator stock is not in competition with choice fresh birds, when placed upon the market. The Rural New Yorker some years ago told how a certain New York retailer thawed out some chickens, brought out of a refrigerator, and which had been frozen solid for months. They were placed into cold water and allowed to remain for a time. They came out as fresh looking as if they had been killed the day before—and that is the kind of "chicken" the city folks are often compelled to feast upon.

The middle of July is pre-eminently the season for Spring chickens, says the New York Tribune. The delicious broiler is then at the lowest price. Fried chicken was the delight of old Southern cooks of ante-bellam days, and was served with the sweetest and lightest of pone bread.

In France and England the broiler is of little importance, the roasting fowl being preferred.

"Squab broilers" must not exceed three-quarters of a pound dressed. They sell best during January and February. The increase of the squab pigeon business is hurting the "squab broiler" boom.

Chickens two pounds or under are known as broilers (in some sections of Pennsylvania they are called barbecues). Over two pounds in weight up to four, they are classified as Spring chickens. Over that weight they go as stewing or roasting fowls. Broilers in some parts of the country are also known as frying chickens. The Spring chicken is introduced about April. It is the broiler's substitute.

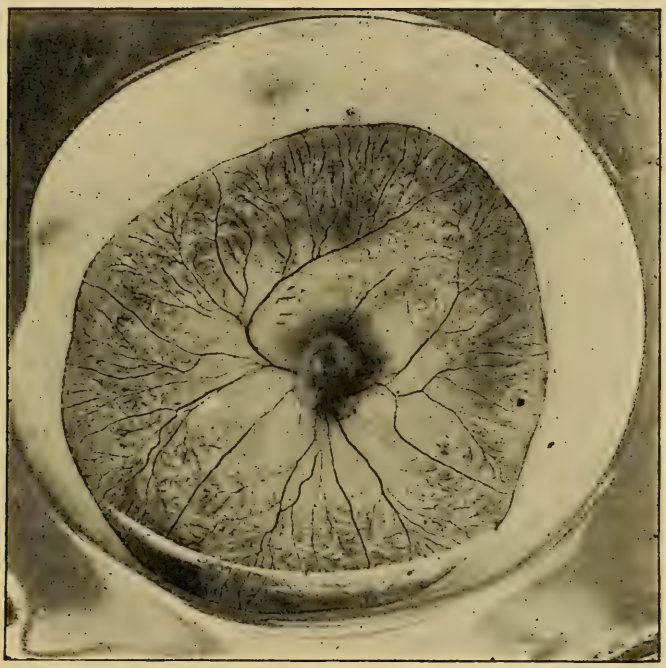

Plate 8—SIX DAYS INCUBATION.

In the Chicago market the best broiler prices are realized from March to July.

Chickens sent to market should never be drawn. **Dr. P. T. Woods** claims that the undrawn carcass is objectionable because of the possibilities of osmosis carrying taint or poisonous matter to the flesh. This point is exaggerated by writers of hygiene and those who favor market poultry. Granted that in some cases where fowls are not properly handled, there exists a possibility of infection of the meat, it is not half so dangerous as the many chances of infection in drawn fowls. As a matter of fact, where the bird is properly handled before killing, the chance of infection is practically nil.

We cannot control the carcass after it leaves our hands to go to market, says Dr. Woods. If it is drawn, and has any distance to go, it may mould inside; or if a fly does not "blow" in it, there is a large exposed surface hidden from sight, which may become infected by some means during transit. If mouldy, sour, or fly blown (if it travels any distance, it is pretty sure to be one of these, or all three), it is no longer saleable, at least for anything like a fair price, and it is not desirable as food.

Dr. Woods "hits the nail upon the head" in the following selection from his article in **"Farm-Poultry:"** "In dealing with market poultry we have to deal with many unknown factors. So far as I am concerned, I had rather take my chances on an undrawn fowl, no matter how poorly handled before being killed, than to have a fowl that has had the filthy fingers of some person unknown (perhaps diseased) scratching about tearing out the entrailes, and following up the operation with washing out the carcass with not over-clean water. The chances of infection from such sources are far more numerous than any that may exist from the intestinal contents and possible osmosis. Again, if the intestines are left in, you have the opportunity of learning something about the fowl's condition at the time it was killed and whether or not it was healthy."

The marketmen are in the business for what there is in it, and it is for their interest to keep and sell the best. It is necessary to expose their goods for sale and a carcass of drawn poultry hung in the market stall makes an ideal place for a fly to get into the abdominal cavity out of sight, and deposit its eggs, says Dr. Woods. The result is that the customer finds the carcass "fly blown" or worse—maggoty. The result is not pleasing to the marketman or the purchaser. As a matter of fact, opening up the abdominal cavity and removing the viscera exposes a larger surface to bacteria infection, while in the undrawn fowl the infection if any is confined in the intestines, except such of the objectionable matter which may pass through the walls of the intestines by osmosis. If poultry is properly handled before killing, and is properly cooled before packing, there will be very little if any contamination from the empty intestines.

The first requisite for success in market poultry is the judicious selection of a variety for the purpose intended, says the Prairie Farmer. For the purpose under consideration, pure-bred fowls are so far superior to mongrel stock, that no one who desires to make the best of it should for a moment entertain the idea of using mongrel or mixed varieties.

Here are some important facts to remember in shipping broilers to market: If possible, never ship dressed poultry in warm, damp weather. Don't ship bony, skinny stock and expect fat prices. Don't ship dressed poultry half-picked, with flesh torn in places, and then blame your commission man if his report shows sales under the market price. Don't ship to every strange house that solicits your consignment. Look them up first. When a house asks you to investigate its references, do so. Oftentimes you will con-

clude not to ship, and thereby save your stuff. Don't ship dressed stock in any old box that is handy. It pays to use clean, fresh boxes, using care and neatness in packing. Frequently the buyer is present when the box is opened, and a sale spoiled because of the packing. Don't pack poultry after dressed, until all the animal heat is out. Don't let some little market fluster cause you to change houses. Get a good, solid house and stick to it. That keeps the commission man interested in retaining your trade, and oftentimes he will put you out of a hole caused by a glut. Don't fail to carefully inspect your shipment before closing the box. Put in the memorandum on your own billhead or envelope, showing the count and other data. Keep a duplicate yourself, and thereby save much annoyance and frequently a loss. Don't chase off into a new market with untried people, just because of a possible temporary advantage. Nine times out of ten you will lose. Keep in touch with a good house in several markets, and use judgment in shipping to any of them. Don't fail to notify your commission house before or at the time you ship, and give full data, so he can know what is coming, and can prepare to handle it rapidly. On this great point hundreds of dollars are lost every week which would be saved if shippers would advise several days before shipping, giving the receiver time to reply, if advisable, to hold back.

Never send fowl to market that has a full crop. Remember, dry-picked poultry will stand longer shipments. Never pack culls with good stock. Keep each in separate lots.

Arthur Duston says it is generally the bird than can stand the greatest amount of food that makes the quickest grown broiler, and must be the bird you should adopt, as every additional day means additional cost for labor, coal and food.

When hatching and raising for early broilers especially, the Maine Farmer says there is not much difference in the breeds, as during the first six weeks chicks of the different breeds weigh pretty much the same; but after that age the difference begins, and there will be a steady and continuous gain on the part of the larger breeds, that at maturity is often very considerable.

Iowa Homestead says some people are in such a hurry to have their chicks grow to broiler size that they begin stuffing them with any and everything they will eat, and usually end by losing the majority of the stock by indigestion or bowel trouble. Then they will look wise and talk about cholera, damp weather, etc., when the trouble really was too rich food fed too early in life.

The New York Produce Review says some poultry raisers make a practice of keeping pure-bred male birds and scrub hens, whereby a good grade of market poultry is produced. These growers would find it little more expensive to get pure-bred hens and raise pure-bred poultry, and in most cases the full-blooded stock would command a premium even if marketed in the wholesale market alive.

The poulterer who places upon the table a plump, juicy broiler, is entitled to as much respect as the planter who furnishes flour, or the cattle king who raises beef.

Given healthy life and intelligent attention, the little chicks may be expected to start with one and a quarter ounce in weight—for the production of life causes a loss of just about one-half the weight of the egg, says an exchange. At the end of one week the chick should weigh two ounces; two weeks, four ounces; three weeks, six and a quarter ounces; four weeks, ten ounces; five weeks, fourteen ounces; seven weeks, twenty-three and a half ounces; eight weeks, twenty-eight ounces; nine weeks, thirty-two ounces; ten weeks, thirty-six ounces.

"Asparagus chickens" are large enough to broil with early asparagus. They are hatched in late July and August, pushed along till November, then killed and put in cold-storage for the winter. They are taken out and eaten in Spring.

Poultry commission merchants say that one reason why a great many shippers are disappointed in the prices they receive on good poultry is that they persist in shipping stock of sizes which are not in demand.

The New York city markets will take poultry either scalded or dry-picked. Boston market wants only dry-picked stock. Chicago markets prefer chickens, ducks and geese scalded, and turkeys dry-picked.

The commission merchant does not fix the price. He can only obtain what his customers allow. When the market is full, the customers have a larger stock from which to select, and they always select the best, leaving the second-class stock to be sold at hazardous prices.

Thomas F. Jager says the broiler industry is considered, by men who have experimented in this line long enough to be entitled to a standing, as one of the main sources of profit in the market poultry business; especially, if the turning out of birds can be accomplished prior to the hand-raised stock, as furnished the cities by the farmers or small land owners.

The first essential, continues Mr. Jager, in order to succeed as a broiler man or woman—for this branch holds great promises for the gentle sex—is to have good healthy breeding stock. That means stock not hampered or forced while young, or where the parents have been inbred to get a certain lacing or tip to the feather. The broiler man does not care a rap for the plumage condition of his breeding stock, as long as the natural vigor and stamina and characteristics to impart to the offspring plumpness of body are found.

Farm Journal says, in calculating what young broilers will weigh when prepared for market, get the live weight and deduct twelve per cent. and you have the dressed weight.

W. Theo. Wittman, in American Poultry Advocate, says: "Squab broilers for home consumption are easiest dressed by skinning. Slit the skin along the back, and taking off both skin and feathers is the work of only a minute, while picking the feathers and pin feathers off a lot of squab broilers is the work of hours. Boiled for a few minutes in salted water, and fried in butter, gives you a dish equal to frogs' legs."

Squab broilers may be grown in eight or ten weeks in brooders, kept in a room where the temperature is about seventy degrees. The Rhode Island Experiment Station found that when marketed at this age, they could be successfully raised without any outdoor exercise.

The following interview between the editor of the Poultry Monthly and a large New York commission firm, contains valuable information:

"What size broiler will be mostly in demand during September?" I asked Mr. Van Ostrand, of the firm of Knapp & Van Ostrand. "About two pounds each. That is a very popular size at almost any time of year; a broiler of that size enables a restaurant to serve a half chicken and give a goodsized portion to a patron. From one and one-half to two pounds is the best all-around weight." "How about the demand for squab broilers?" "There is little demand for them now. The greatest demand is in Spring when game birds are scarce, and a small bird is in demand in restaurants. They should weigh from three-fourths to one pound. There would be no sale for them now at prices that would make it profitable to make a specialty of them, because there are so many chickens coming in from the West, and among them can be found all the small chickens required, at low prices. Many who ship squab broilers make a great mistake in sending such bony, poor ones. I have seen many of them that were but skin and bones. They must be plump, with some meat on the bones." One has only to go through the markets to have these facts about the shipment of poor stock verified. I have seen many a coop of live chickens that would not weigh more than one-half pound each, and were miserably poor and thin at that. The same is true of dressed broilers. Many people hear that some people have sold chicks weighing less than a pound each for what seems like an extra price, and immediately a lot are sent without any knowledge of the demands of the market, or the prospects of sale. The demand for anything out of the usual order is always limited, and it is usually supplied by some one who is thoroughly posted, and is situated so close that he may watch the market. However, it pays to study up these special products and demands, and then study the question as to what can be done towards supplying them. But don't go it blind.

CHAPTER III.

What are the Drawbacks?—Profitable Way to Conduct the Business—Growing Small Broilers.

Several years ago the writer wrote a number of broiler raisers, asking what they found to be the greatest drawbacks in raising chicks, and how they met them. Following are extracts from their replies:

Austin Long, Pittsburgh, Kansas: "My biggest drawback in raising chicks is the wet weather, but I meet it with dry coops and small yards on the bare ground. I also feed dry food during rainy weather."

Matt. G. Robson, Port Leyden, N. Y.; "The path is full of drawbacks, but what one must do is to move them out of the way. Be determined not to be beaten. One drawback was not to own the place up to a year and a half ago. That was a serious drawback, as there are very few rented places that have a good hen house, or other poultry buildings. The result is you have to plan with what you have—and a lot out of your profits is to build and perhaps move the next year. Feeding rats, lice and strange cats and dogs is likewise a drawback. But whatever the stumbling block, keep right on trying till you finally win. The poultryman is not worth a tinker's cuss until he wins by his setbacks. The more drawbacks the better the poultryman, if he has grit to get out of them."

Robert Atkins, Esopus, N. Y.: "Crows are our greatest drawback, making it necessary to carefully yard all chicks. Gapes also keep us on the lookout. This we manage pretty well to avoid by cleanliness and dry coops."

William G. Good, Bowmansville, Pa.: "The drawbacks are few, if proper care is given the stock. The poultryman has many duties to perform, and the neglect of one might bring failure."

A. DeR. Meares, Hyattsville, Md.: "I have no drawbacks, as I give good attention to feeding and care, and have a good place for my stock."

Charles A. French, Sandy Point, Maine: "I don't seem to have any. A few are born to die; natural enemies get a few chicks in spite of vigilance. No fault to find with the existing state of things."

Emory E. Banks, Crittenden, N. Y.: "The worst drawback I have in raising chicks is varmints—and drowning by storms in rais

ing with brooders. The only way I find to prevent brooder chicks from drowning in sudden storms, is to enclose them in long yards having at each end the brooder in a shed or house, with a wide entrance; as wide as the whole side of the house is better. It is much safer to have shelter at both ends of the yards."

P. F. Daniel, Atlanta, Ga.: "I have only one drawback this season—tuberculosis struck my brooders; which was a new disease to me. It took some time to locate it. I must give credit to the Rhode Island Experiment Station Bulletin, No. 61, for explaining the disease, cause and remedy—the latter, sunlight and fresh air, which is plentiful here in the Sunny South."

Market poultry experts generally agree that the most profitable way of conducting the business is to combine egg farming with broiler raising. In this way a regular income can be maintained the entire year. But just how the combination should be conducted all do not agree.

Some say, make egg farming the prime object, and only hatch broilers when there is no sale for eggs. We cannot exactly understand that logic, as there is constantly, every day in the year, a call for this article, and the supply does not equal the demand. It must be that the writer has reference to the retail trade.

In some sections of the country eggs take a decided drop as soon as spring opens, while in other sections the prices remain good until summer. Where contracts are made at a certain figure for the entire year, of course it becomes another matter.

To our liking, we should say, sell eggs as long as prices are good, and turn them into broilers when the price declines. We should sell them so long as the retail figure did not get below twenty cents a dozen, and begin incubation when that price was reached. We believe that it will pay better to turn eggs into carcasses than to sell at less than twenty cents a dozen.

Some writers claim that to produce an egg costs one cent; this would make their cost twelve cents a dozen, and anything over that would be clear profit. They will sell eggs so long as they can get eighteen cents, or over that; at eighteen cents they have fifty per cent. profit, and they are content with that.

Supposing that a dozen eggs cost twelve cents, and out of that dozen only four chicks were raised up to a marketable weight, and the total cost including price of eggs would be one dollar for those four broilers, and they brought one dollar a pair, the usual price in the New York market, there would be an even dollar profit. Of course in some sections of the country broilers would not bring one dollar a pair; but then generally in such localities feed is cheaper, which would about equalize it, and besides we have given a very low percentage of hatch and rearing.

There is money in the broiler business, but it is a branch that must be entered carefully, managed diligently and perfectly understood, if success is to result. No amateur should start this branch on a large scale. He should begin at the very bottom of the ladder and carefully climb up. There is so much to know: First, how to

run the incubators so that they will require less responsibility and do best work; second, how to brood the chicks so they will not become chilled and die from bowel troubles; third, how to feed so that they will attain the desired weight without being subject to leg weakness and other troubles. All these matters must be carefully studied and watched. There is a big responsibility and the work requires "eternal vigilance."

Egg farming is the easiest branch to follow. Start with that and let the broiler department be an adjunct.

James Rankin believes there is more money in raising roasting fowls than broilers. Some others prefer capons; but we are inclined to think that the latter branch never will make any headway in this country. There is not enough demand for the capon carcass to make it an object.

Squab culture, properly speaking, comes under the head of market poultry, and quite a number of market farms are adding the work to their line.

There is money in raising ducklings for market, but it is a branch that requires more real hard work than any other. On Long Island, up in Massachusetts, in New York, in Pennsylvania, and in other parts of the country, quite a business is being established in this line; and on many duck farms is made the combination of hen-egg production for market.

Turkey rearing is profitable, but a good range is necessary; so with goose farming. On this account we think these fowls are neglected on many farms.

On farms where fancy fowls are reared and eggs sold for hatching, it is not always advisable to sell pure-bred eggs in market for table purposes, as they do not always reach that end. So these fanciers add broiler or roaster raising as an adjunct; the birds being killed and dressed before going to market, there can be no chance of falling into the hands of undeserving parties who would use them for breeding purposes.

There was a time when the fancier hated the marketman as much as one rival in business could despise the other; but after they became acquainted, after they found out that neither could do without the other, they combined, and to-day there are more fancy farms with market additions than farms on which the fancy alone is followed.

It was a good change. After all, the only purpose for which poultry was created was for food. Fine feathers and high scores may attract the eye of those who love the beautiful; but if this beauty is gained at the sacrifice of the utility qualities, it is only a matter of time before the breeds will drop down and out. Take, for instance, the once famous Black Spanish fowl. What more noble bird could have been created? What breed can give us the sized eggs for which they were noted? Where are they to-day? A foolish standard called for a large white face, the larger the better, and to-day the Black Spanish is way in the background; and we say it is a most unfortunate affair. No breed ever made such a happy

hit as did the Black Minorca, when it stepped in right at the time the Spanish were going backwards. A call for a huge crest likewise injured the once popular Polish fowl.

Now, these remarks are not made to stir up a controversy, but are honestly given by one who has made poultry culture a study, and who devotes his entire time to the cause. We believe in poultry revenue, and the only way to get it is to come down to common-sense business principles and methods.

The growing of small broilers, or squab broilers, as they are more familiarly known, is an industry that started out with bright prospects, but the sudden boom in squab pigeons seemed to cripple

Plate 4—CHICK—Fifteenth Day Incubation.

it considerably. Still there is room for the enterprise, and quite a number of farms are making a specialty of it. Following is a very complete account of the methods pursued in this branch. They are given by the superintendent of the Owls Nest Farm, Framingham, Mass., and originally published in the "American Agriculturist." The specialty is the growing of small broilers, which are sold at a weight of about three-fourths pound dressed. Chickens of this size are from five to eight weeks old, smaller than pigeons.

Owls Nest Farm has been run for three or four years and has built up a large trade of the above description; 285 of these small broilers were sold from January 1 to January 20, mostly to clubs and high-class private trade in Boston. This branch of the business is continued the year round, although prices grow lower in the summer and fall. Incubators are started the last third of January, and

from 8,000 to 10,000 chickens are hatched out during the year. The breeds used for broilers are Wyandottes and Plymouth Rocks. Said Superintendent Woodland: "Even for light weight broilers such as we produce, the small breeds like the Leghorns are not satisfactory. They need to be two weeks older than the Plymouths to give the same weight.

"The chickens are not fed for the first day after hatching. Their first food consists of broken crackers softened in water, cooked mush and bird seeds. They are fed very often at first, four or five times or oftener, each day. As soon as they get well started their main soft ration is a mixture of corn meal and middlings, half and half, which is made early in the morning and allowed to stand until about nine o'clock and fed warm. The first feed, fed very early in the morning, is hard grain. Cracked corn, cracked wheat or cracked oats are fed at noon and at night. They get one quart of meat scraps in the mash for each 2,000 chickens. For green food they have cabbages to peck at, and clover hay steamed. Mica grit, charcoal and water are kept constantly by them.

"They are kept warm by hot water pipes about six inches from the floor of the pen. Sand is filled in under the pipes to varying heights, according to the size of the chickens. The end of the pipes nearest the broiler are warmest and the youngest chickens are kept there. The great point in raising healthy winter chicks is to keep them from scratching.

"The grain and bird seed is always fed in sand or litter in order to make the chickens work for it. All our chicks are raised by incubators and brooders, and by comparison with hens which are used some years we find that we can hatch and raise 25 per cent. more chicks by using incubators and brooders.

"In finishing off the chickens for market, something depends upon our orders. When a lot of chickens are needed in a hurry two or three weeks hence, they are put in a fattening pen and fed all they will stand. Giving as great a variety of food as possible in feeding them. Just before they get all they want we takes the dishes away, leaving them a little hungry. Then the next feeding time they will be looking for more. They could not stand this high feeding process very long at a time, but when they are to go to market in two or three weeks, they can be quickest finished off in this manner. Chickens which are to be kept a longer time must be fed less, kept hungry all the time, so that they are ready to fly out of the pen when the man comes around with the feed. They must be kept scratching. The best we can do, we lose an average of three or four a day in winter."

When the chickens are wanted for market they are carried in baskets to the killing house, where they are dispatched by stabbing the back of their mouth with a lancet. The head is not removed. They are not fed for twenty-four hours before killing and the entrails are not removed. They are dry picked and packed in pairs in pasteboard boxes made to fit. There is an ice box for cooling the dressed poultry in summer.

CHAPTER IV.

Artificial Methods, and Hints That Will Prove Valuable in Running Any Incubator or Brooder.

"Be at your post!" is a command that must be strictly obeyed, for in operating incubators especially, it is a mistake to place too much reliance on their automatic appliances. Some machines require more attention than others, but all must be regularly looked after, since it is impossible to install brains into the wooden hen.

So much has been said and written upon this subject, that we will but briefly touch upon the different points to be considered. "A hint to the wise will be sufficient." We jot them down as they come to us:

Never sprinkle the eggs while in the incubator. That was one of the earliest theories that the experts exploded.

Always fill the lamps in the evening. This will make a stronger blaze and more surely carry the heat during the night.

Never use oil less than 150 degrees test. Cheap oil is dangerous oil.

It is a good policy to begin each hatch with a new wick.

The proper temperature for hatching is 103 degrees for an average. A few degrees above or below that mark will not do any serious damage.

A dry cellar is the very best place for running an incubator.

Never trim a wick; scrape off the charred part with a burnt match, or a piece of stick.

Cooling the eggs makes strong chicks.

The incubator room must be ventilated, but there should be no draughts.

Never allow the lamp to become empty.

Never have the incubator standing near a window.

A good time to do the first testing of your eggs, is at the end of the first week.

No moisture is required in the incubator if the air is humid.

In testing a new machine, be sure to closely follow the instructions as given by the manufacturer.

Never turn nor cool the eggs after they begin pipping.

Begin turning the eggs after the fourth day; turn them night and morning.

Keep the burner free from dirt, and see that the little sieve on the burner is not closed up, so as to have a free circulation of air.

If the temperature gets too high, the hatch will come off before it is due; and if too low, the hatch will be delayed several days. Either extreme is detrimental to the strength of the chicks.

Never add eggs to the incubator after you have started the hatch.

Be careful that the flame of the lamp is not turned up so high that it will smoke. In this way soot is gathered and very often the machine is set on fire.

Make a study of the air cells, and govern the treatment according to their size.

In placing the eggs in the incubator, see that the large eggs are all pointing the same way in the trays.

Sometimes a delayed hatch can be hastened by placing sponges, dipped in boiling water, in the machine.

After the fourth day the eggs can be cooled, doing so only a little at first, and longer as the hatch progresses.

If the air cell of the egg is very large, add moisture, and if very small, take away what water you have in the pans.

After the eighteenth day, do not turn nor cool the hens' eggs.

The air cell on the fifth day should measure about a quarter of an inch; tenth day, half an inch; fifteenth day, five-eighths inch; nineteenth day, three-quarters inch. Take measurement from middle of large end.

Chilled eggs will not hatch.

Be sure that your thermometer is correct. Nothing will do as deadly work as an inaccurate thermometer.

Likewise see that the regulator really regulates. We have seen quite a number of regulators that needed regulating very badly.

"Eternal vigilance" should be the watchword. There are so many little details in this work, that unless you give it the closest attention you will have trouble which is not so readily adjusted. The successful broiler raisers of to-day are those who "stick to the ship" from beginning to end.

We have little or no faith in hygrometers or moisture gauges.

After each hatch, see that the incubator is thoroughly cleaned and fumigated.

To get the correct temperature of the egg chamber, see that the bulb of the thermometer rests upon a strong fertile egg.

While you are cooling or turning the eggs, keep the incubator doors closed. Do not try to hatch duck eggs and hen eggs in the same machine at the same time. The conditions for each are different. Neither place eggs of different varieties in the machine at the same time. A mixture of white and brown shelled eggs will give unsatisfactory hatches, for the reason that the brown shelled egg is a much harder shell and requires different treatment than does a white shelled one.

Before you start the incubators in the house cellar, consult your insurance policy. Ten chances to one, there is a prohibitory clause in it which would cost you your insurance.

Keep a record from the time you start the incubator until the

hatch is completed, and note all changes and experiences. This will be furnishing you with valuable information for subsequent hatches.

Incubators can be successful in a room above ground providing the temperature of the room does not readily change.

Fifty per cent. is the average hatch; and an average of fifty per cent. of chicks hatched are marketed.

In cooling eggs, place a thermometer on them after they have been turned, and when 85 degrees are reached, return the tray to the machine.

It is not always the fault of the incubator when the hatch is poor. Sometimes the eggs are to blame, but generally "the man behind the incubator" is at the bottom of the trouble.

Bear in mind that the dryer the air, the more rapid is evaporation.

Never have the flame of the lamp higher than is strictly necessary.

The eggs themselves throw off very little heat for the first two weeks.

A high temperature during the early part of the hatch is apt to prove fatal. A temperature of 110 degrees on the eleventh day will not necessarily kill the hatch, unless it is allowed to continue too long.

Rankin says that if no more water surface is exposed in warm weather than in cold, not more than one-half the moisture is secured.

After removing the infertile eggs from the machine, spread out the fertile ones so that they occupy about the same relative position to one another.

The greatest excess of heat for a short period, says Cyphers, can probably be withstood, after the sixteenth day, when the growth of the allantois is completed.

C. E. Chapman, in "Rural New-Yorker," says enough extra eggs can be put on the trays to fill out the trays after the infertile ones are removed. He marked them "extras," and found that placing them on top of the others for five days did no injury. This gives the full capacity for the whole hatch. If that method will hold good, it is valuable, but we very much doubt it. However, it may be worthy a trial by one of an experimental turn.

A. J. Hallock says it will not pay to overcharge the machine, as recommended by Mr. Chapman, as the top eggs will be a degree or more hotter than the lower ones, which will be detrimental to the hatch.

Cyphers, in his book on incubation, says he finds the temperature of the eggs will average up, at the end of the first day of incubation, at about 97½ degrees; at the end of the second day, 98¼ degrees; and from this time on will gain uniformly one-fourth degree a day until the end of the eleventh day, having a temperature at that time of about 100½ degrees. During the next two days the

temperature rises to 101½ degrees or 102 degrees, and remains more or less stationary at 102 degrees until the end of incubation.

When turning the eggs by the trayful, says Prof. Wheeler, turn slowly and not by a quick whirl.

"My only guide in regulating moisture is to feel the air when I open the incubator doors," says James E. Rice. "It should have a warm, humid touch and a live smell."

A uniform heat, and one that will not bring out the chicks ahead of time, is the most important. William H. Truslow thinks 102 degrees on a reliable thermometer will give better results than 103 degrees.

Prof. William P. Wheeler says that unless the eggs are graded more evenly than seems possible in general practice, a slight percentage of loss of the fertile eggs is unavoidable where a large number of eggs are hatched in one machine.

B. Holmes says weak germs in an egg from a hen out of condition, account for a part of the deaths in the shell. A hen may be out of condition one day and better the next; what affects one or more hens in a pen, may not affect all alike; therefore, the eggs from the same pen may vary in vigor from day to day, or week to week.

William H. Truslow says he fears that none of the manufacturers of incubators can, as yet, held a candle anywhere near a good sitting hen. But there are so many poor hens that will do everything but sit properly, that 1,000 eggs set in machines, even though they do not work quite satisfactorily, will usually give as many chicks as 1,000 eggs under hens, and a machine will sit when you can find no hens.

Never remove the chicks from the incubator at night—wait until the next morning.

James Rankin says he has kept eggs six weeks (for an experiment) and hatched about fifty per cent. It, however, is a poor policy to keep eggs longer than one week for incubation; the fresher they are the better the hatch and the stronger the chicks.

In running the machine in a cool room, the moist air in the incubator will condense on the glass doors.

James H. Seeley says eggs for hatching should be kept in a dry place at a temperature of 50 or 60 degrees.

If possible, eggs of the same age should be set in each machine, as old eggs need more moisture, on account of the air cell being larger.

Never expose the incubator to sunlight.

Pure air is necessary in the incubator room.

Lamp trips are good so long as they work freely, but they are very apt to get out of order.

Always run the incubator several days before putting in the eggs. Be sure that every part of it is working rightly.

Never try to run the incubator in a room that is heated up during the day, and allowed to cool off at night.

The "Reliable Poultry Journal" advises, for washing out the

egg chamber, trays and turning rack, if they are soiled or musty, to use hot water, into which a liberal amount of baking soda has been mixed.

The same journal gives this method for keeping eggs for hatching: Pack the eggs in boxes containing oats, bran or dry sawdust, filling the box full and screwing on the cover. You can now turn the eggs by simply turning the box half way over. The common way is to stand the eggs on end when placing them; it does not make any difference which end.

J. L. Campbell gives this method for determining the moisture in eggs. Try them in warm water at the end of two weeks. If they sink they are too moist. If they just float they are a little too moist. If they float high they are too dry; but if they float with a space which could be covered with a silver twenty-five cent piece, they are about right. This will be the average only, as some will be less and some a little more. Less is better than more. This is a reliable test in all cases, and one can prove it by trying it long enough and often enough. If the eggs float as stated, and a poor hatch results, the trouble must be looked for elsewhere. It will usually be found in the temperature.

Fasten a card to each incubator, stating when the hatch was started, when the tests were made, number of infertile eggs, number of chicks hatched, number dead in the shell, and a general description of the conduct of the machine during the entire three weeks.

In selecting eggs for hatching, do not use those undersized, neither extra large ones. As a rule double-yolked eggs will not hatch, while the extra small ones will give weak, puny chicks, if any. A rough-shelled or a thin-shelled egg should also be rejected. Eggs having a bad shape, or which have ridges around them, are very unreliable.

It is a good plan to shift the trays each day from one section of the machine to the other.

Have the regulator adjusted at one hundred degrees before putting in the eggs.

A chick too weak to free itself from the shell, will be too weak to amount to anything afterwards. Better leave it alone.

If the temperature of the machine runs down while the eggs are hatching, the chicks are apt to stick fast to the shell.

A. F. Cooper says the four points of success with incubators are, first, even temperature of 103 degrees; second, fresh air; third, air-cell one-fourth to one-fifth the contents of the shell; fourth, cooling.

H. S. Thompson, in "Farm-Poultry," gives this pointer: Cut two narrow cardboard strips for each of your egg trays. Write or print "Night" on one, and "Morning" on the other. Tack each one to the sides of the tray that show through the glass door. When turning your eggs see that the trays are shifted around so that the sign "Night" shows at night, and "Morning" in the morning. This will insure the even application of heat, which is so important.

It is difficult to dry down the eggs in a damp cellar.

Moisture pans in incubators should be above the eggs.

S. C. Stubbs says he has found that it requires a higher average temperature, by about one-half a degree, when the eggs are cooled than when they are not.

After the incubating season is over, place the burners in hot water, to which add about a tablespoonful of washing soda, and boil for several hours. This will thoroughly clean them of dirt and make them safer for another season.

In selecting an incubator, says W. D. Rudd, it is of vital importance that a first-class one be chosen; one that will not only hatch well, but hatch strong, healthy, vigorous chickens, for a chicken not well hatched had better remain in the shell. To start with a poor incubator at the opening of the season, is like planting a field with worthless seed, and waiting the entire summer for them to sprout. A complete flat failure is as certain in one case as the other.

Campbell prefers an incubator room above ground.

An unincubated egg is a very poor conductor of heat. The shell, however, is one of the very best conductors, and to it the more uniform heating of the egg is at first due. In illustration, Mr. Cyphers says, if a piece of muslin be smoothly wrapped around an egg, it may be held in the flame of a lamp, until the whole egg is hardened, without the muslin burning, so rapidly does the shell conduct the heat away.

Do not be too hasty in removing the chicks from the incubator. It will be all the better to allow them to remain for twenty-four hours, so that they will be fully dried.

In closing the incubator door, see that the jar has not put out the lamp flame.

Don't lose sight of the fact that there is enough moisture in an egg to hatch it. Therefore, the art of properly applying ventilation is of more importance than the moisture question.

Eggs will stand a greater variation in temperature the last week of the hatch than they will the first.

To test thermometers, place them in water, warmed to 102 degrees, alongside a reliable physician's thermometer. Stir the water continually while testing.

In airing eggs, Mr. Stevenson says, if the room is 40 to 50 degrees, 10 to 15 minutes is long enough; while if 70 to 80 degrees, 20 to 30 minutes is none too long.

In a room of 60 degrees temperature, eggs will lose one degree in two minutes; in 40 degrees, about one degree in one minute.

If we run the ventilators one-third open in a room with a temperature of 40 degrees, they should be all the way open if the room should be 80 degrees. Always the warmer the room, the more ventilation should be given. The ventilation must, also, be regulated according to the atmosphere. Dry climates require much less ventilation than where the air is laden with moisture. The amount can be determined only by careful observation. If the chicks come

out weak, and appear sticky, not drying off nicely, there has not been enough ventilation.

"During the last week, an egg containing a living chick, will be one to two degrees warmer than an infertile egg directly beside it," says Mr. Stevenson. "Thus if the bulb were resting continually on an infertile or dead egg, we would be in the same fix as though the thermometer registered too low, and if changed from fertile to infertile, as would be the case were they not tested, we would be continually adjusting the regulator, and wondering why the machine does not regulate itself more closely. On the whole, I prefer having the thermometer hung just above the eggs; in this way, we get the temperature of the egg chamber, and all eggs are subject to the same degree of heat, the same as when under a hen."

In answering to the theory that cooling eggs is detrimental to the hatch, Mr. Stevenson, in "Rural New-Yorker," very wisely says: If the change from 103 degrees to 60 degrees or less for the few minutes required for turning, is too great, what about the sitting hen that comes off occasionally for food and water, even though the temperature is 20 degrees or less? She will stay off in zero weather much longer than the time required to turn the eggs from an incubator. In my opinion, the change, if not long enough to chill the eggs, will give stronger chicks than the continually closed machine or the hen that sits more closely. It is much easier to get the desired air-space in the eggs when the incubator room is at 50 degrees, than when at 80 degrees, and I find it much easier to get out good hatches of strong chicks in the early spring than in hot weather.

By far more chicks never see daylight, or pass to rest quickly after hatching, on account of too much moisture than not enough, and unless sure the make of incubator and surrounding conditions require it, one should not use any moisture, or at least, not until the last few days of the hatch. Too much moisture will not only cause many chicks to die in the shell by causing an abnormal growth (the chick swelling so as to completely fill the shell, making it unable to turn and break its way out), but many of those that do hatch will not be much expense for feed, as they will not stay long. Some incubators will require moisture in the same room where others will do much better without any at all. There are a few machines that require the moisture pans to be filled at the beginning of the hatch and kept full, owing to their having both top and bottom ventilation, making a direct current of air passing through the egg chamber constantly. The best way to determine the amount of moisture required is to examine the eggs occasionally with an egg tester, and note how the air space is growing; unless it appear as though it will occupy more than one-third the shell by the end of the hatch, no moisture should be supplied. It is a good plan to set a hen at the same time one starts the incubator, and compare the eggs occasionally.

Cripples are generally caused by being too long imprisoned in the shell.

When eggs are overheated in the start, the chicks are generally found dead in the shell when the hatch is due.

J. L. Campbell, the incubator expert, says: "Although I have been raising chickens all my life, I learn something new every year."

We do not believe that it is possible for any incubator to make a hatch, regardless of conditions, without some moisture. We know that under certain conditions it can be done, but not always.

Turning eggs during incubation prevents the blood vessels growing fast to the shell.

When chicks form near the small end of the egg they are apt to die in the shell.

Always fill the incubator with eggs, when starting; a half-full machine cannot do as satisfactory work on account of the amount of dead space.

The correct position for eggs during incubation is on their sides with the large end slightly higher.

It is possible to make a good hatch without testing the eggs, but such cases are rare and accidental.

Sixty degrees will neither start nor chill the germs in the eggs, and will keep them good longer than any other temperature.

Handle the eggs in the incubator as little as possible. Sweaty and dirty hands stop the pores of the eggs, and may also impart delecterious odors when such eggs are returned to the incubator heat. There is not enough stress put on the importance of having strictly clean hands when handling eggs in the course of incubation. The incubation of eggs may be stopped by what seems a very insignificant cause. Avoid handling as much as possible.

The following pointers are taken from an extended experience, and will be found useful:

If you notice the chicks crowding, you will know that they are suffering for more heat in the brooder.

Where less than a thousand chicks are hatched a season, reliable sectional brooders are better and more economical than the pipe system.

Seventy degrees is warm enough for chicks after they are three weeks old.

When the chicks scatter about the brooder at night, they are comfortable, and all conditions are right.

Ninety degrees is hot enough to start the chicks in the brooders.

Cyphers says that chilled chicks, kept in a brooder where the temperature is up to 100 degrees, and fed on bread and milk, generally recover.

Make note of the number of chicks you put in the brooder, and have kept a memorandum of all deaths and, if possible, cause of same.

Any good incubator will hatch eggs if rightly attended to, but raising the chicks after they are hatched is the rock that shipwrecks nine out of ten incipient poultrymen, truthfully states F. H. Richardson, in "Northwestern Horticulturist."

Never use the full (advertised) capacity of the brooder. No more than fifty chicks should be kept in any brooder at one time.

Too high temperature in the brooder will cause the chicks to "steam," resulting in loss.

As the lamps in an outdoor brooder are enclosed in a small box, care must be taken that the flame is not too high, or it may collect soot and catch fire.

Make the chicks exercise in the brooders.

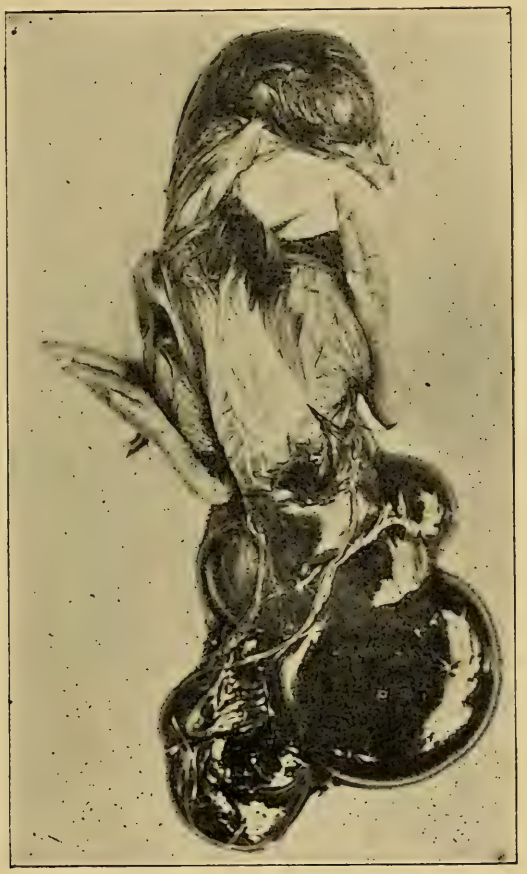

Plate 5—CHICK—Eighteenth Day Incubation.

Sixteen feet is long enough for an outside run for broiler chicks.

Cooper says the usual rate of capacity is five lineal feet of brooders per one hundred chicks.

Chicks in brooders during the summer need no heat, excepting a moderate temperature at night for the first week or two. Too much heat is fatal.

W. H. Rudd, in "Poultry Monthly," says: "We want separate

brooders and rooms and yards for each fifty chicks, and we heat each brooder separately. We never warm a brooder house except by the heat which incidentally escapes from the brooders, nor would we warm it even to prevent every chicken from freezing to death, for in that event they escape the troubles of life, while we save the expense of feeding, and can bury them all in one large grave, which we prefer to having tnem die ten or a dozen at a time, as they surely would from the effects of a warmed brooder house, and involving the bother of several small funerals instead of one large one."

Editor Drevenstedt hits the nail on the head in this: "Utilizing greenhouses for rearing chickens is one of those bright but foolish inspirations unfledged amateurs are guilty of. The whole atmosphere of the greenhouse is death to chickenhood. Chickens, all reports to the contrary, are best raised under natural conditions, and that means in the open air, and on the good old sod. The reason why some varieties of fowls are delicate is because they have descended from parents that have been pampered, coddled and nursed into a state of dudish tenderness. Virility in chickenhood can only be obtained by following nature's laws. A chicken thus kept and treated is as hardy as an oak, and as tough as hickory."

For convenience and comfort in attending to them during bad weather, place all outdoor brooders under sheds.

Campbell recommends carpeting the floor of the brooder.

A thorough painting of all the parts of a brooder with gasoline will do up the lice; the gasoline soon evaporates, leaving the brooder nice and clean.

CHAPTER V.

Artificial Methods as Given by Some of America's Greatest Experts.

In 1891, Farm Journal published an article by M. Sumner Perkins, of Danvers, Mass., on hatching and rearing chickens in winter by artificial means. The article in question was awarded the prize of $25 offered by J. L. Campbell, West Elizabeth, Pa., manufacturer of the Eureka incubator, for the best essay on the aforesaid subject.

We make the following extracts from Mr. Perkin's article, which are worthy of note:

"Broody hens are generally a very scarce article in winter time, so that the hatching of chickens in any numbers at this season must be effected solely through the instrumentality of the incubator. Artificial hatching certainly does away with much labor and annoyance that is generally attendant upon the pursuence of natural methods; and many persons find much more pleasure and satisfaction in running a good incubator than in attending to a sufficient number of broody hens to accomplish a like result.

"As far as the best kind of an incubator to be used is concerned, it is a notable fact that much more depends on the operator than on the machine. An expert, of knowledge and experience in artificial hatching, will often be quite successful with the crudest form of an incubator, while the amateur, or ignorant person, will often fail with the most improved. It is true, however, that the higher priced class of machines are the best and give the most general satisfaction. It is always poor economy to be unduly influenced by cost in the purchase of an incubator.

"Machines without means of automatic regulation are sold very cheaply; and, most invariably, they are of little value, for a first-class incubator, fully equipped in accordance with the present advanced ideas, in reference to artificial incubation, cannot be constructed for a nominal sum. Good material and skilled workmanship in the construction of an incubator, together with an efficient system of self regulation of the same, cannot be secured inexpensively, and a hatching machine without a heat regulator, is like a ship without a rudder. Disaster generally follows the use of the one as of the other.

"The running of the incubator in a small way at first, merely in the line of an experiment, is often of incalculable value to the novice, the experience and knowledge so acquired, promoting a

successful issue from the very beginning. The best location for an incubator is afforded by a cellar, or apartment wholly or partially underground. Here a uniform temperature is preserved, affected to a minimum degree by the various climatic changes. Here also a firm foundation on which to set the machine is offered, and thus any jarring of the eggs is avoided.

"Means of ventilation of the incubator room should always exist, and excessive dampness is undesirable. The incubator should be run empty for two or three days, or long enough to determine that it is working correctly and with precision, registering a temperature of from 102 degrees to 104 degrees Fahrenheit. It is then ready for the reception of the eggs.

"A word right here in regard to the selection of the eggs. First they must be fresh, and the fresher they are the better. All had better be less than a fortnight old. They should be of good size and regular in shape, the shells smooth, of a proper thickness and free from chalky formations. The superiority of large eggs for hatching is apparent. Large eggs have large yolks that supply more nourishment and induce an increased growth within the shell. Consequently, a plumper and stronger chick is hatched, one more sure to live and thrive. The eggs in the incubator must be regularly turned two or three times daily. In some machines this is accomplished automatically by their own operation, and thus any hand labor in this direction is uncalled for. The eggs should always be tested and the infertile ones removed. The latter, if taken out early, are fit for culinary uses, or they may be saved and boiled for chicken feed. The first testing may be made at the end of the third day. A second one should be made as late as the end of the first week, for if the egg shells are dark colored, it is quite difficult to determine the character of the egg at first testing. Also the germs of some will have died after having started to develop, and these will need to be removed. Infertile eggs always have a clear, translucent look. Fertile eggs show the germ as a clot of blood, with veins radiating from it in every direction. Where the germ has died, a reddish suffusion of blood will be apparent.

"The amount of moisture required for the egg chamber of the incubator can be estimated quite correctly after some experience, by the appearance or feeling of the egg shell. Indeed, if the machine is stationed in a cellar, as before advised, little or no additional moisture will be needed. We have made good hatches under such conditions, without the use of any artificial moisture whatever, and have learned of others being successful in the same manner.

"The incubator needs some attention during hatching. The chickens as soon as hatched and dried should be transferred from the egg trays to the nursery, that they may not inconvenience others not yet out of the shell. All pipped eggs should be placed with the chipped side uppermost, that the chicks may have plenty of air, and escape suffocation. Empty shells often impede the hatching by becoming attached to other eggs, and should therefore be removed as soon as present.

"Artificial assistance of chickens from the shell is seldom necessary, nor is it generally advisable, yet occasionally one will be found whose egress is hindered by an unnatural presentation, undue hardening of the covering membrane, or other adverse condition. In such case, a little judicious aid is effective, and serves to set the prisoner free. Extreme care must always be exercised that no hemorrhage be excited. Artificial incubation should always be prosecuted as smoothly as possible. It is true that chickens are sometimes hatched under extreme variations of temperature, yet it is very doubtful if they ever make first-class fowls; while we know that many chickens are hatched every year, that, owing to some abuse (very possibly during incubation), either die young, or, at least, develope into stunted and deformed runts. Hence it is very essential that all natural conditions of incubation be fulfilled to the letter, every time.

"Some people seem to think that when the chickens are hatched, the chief business is over, whereas, in reality it has just begun. There are many who have success in hatching, who experience their trouble in rearing the chickens. Obviously the first thing to be provided, especially in winter, is suitable quarters. They must be warm, dry, well ventilated, and admit plenty of sunlight.

"When a business is made of raising chickens and ducklings on a large scale in winter, a long narrow building is generally constructed, heated by hot water or steam pipes, and furnished on the south side with an abundance of window glass. In this case, one hot water boiler supplies all necessary warmth, and many chicks being under the same roof are conveniently cared for. Thus the cost of fuel for heating is reduced to its lowest figure, and labor is considerably economized throughout. This style of brooder is not adapted to the wants of the majority, however, who do a comparatively small business. For the latter, small brooders or brooding houses, having a capacity of from fifty to one hundred chicks each, are much more suitable. There are both hot water and hot air brooders, but the former are more generally used and are we think much better. Speaking in general, the hot water brooder is provided with a small tank or boiler, which is filled with water and heated by a kerosene lamp. The hot water being conducted by iron pipes throughout the brooder and then returned to be reheated and sent on its way again. There are a great variety of kinds which differ much in detail of construction, but the majority are some modification of the above plan. As far as the best manner of application of heat is concerned, what appears to our mind as most sensible and natural, is to have the most of the warmth dissipated through the air above and around the chicks, with just enough bottom heat to keep the floor a little more than blood warm.

"Outside runs are of course necessary to give the chicks exercise in the fresh air, on all pleasant days. These, for very young chickens, had best be covered with glass, partially at least, as well as the front of the brooder itself. It will be best in very cold weather to have the brooder stationed in some room or house in

which the chill of the atmosphere has been taken off. If exposed to the severity of the weather, it will be necessary to build it much more warmly, as well as roomier, to allow greater freedom for the chickens to exercise, for they will of necessity be confined much more closely.

"The floor of the brooder should be covered with dry loam, muck or fine sand. These are excellent disinfectants and absorbents, especially the first two. This material will need to be frequently renewed, in order to render the brooder sweet and wholesome.

"The newly hatched chicken requires a temperature not much below one hundred degrees for its comfort. This may be gradually lowered as the age of chick advances. The chicks themselves will indicate by their appearance, whether they are comfortable or otherwise. If too cool, they will huddle closely together, and very likely some will be smothered or at least pressed out of shape. On the other hand, if too warm, they will appear lazy and inactive, weakness and disease being the result of such an evil. One of the most common ills to which little chickens are subject is diarrhoea. This is sometimes caused by improper food, but often it is the result of catching cold. Hence it is very necessary that an even temperature exists at all times."

The following pointers are taken from Poultry Keeper, Quincy, Ills.:

If the chicks do not come out of the eggs until the 22d day, or longer, it indicates that the temperature of the egg drawer was too low. They should begin to pip on the 20th day.

If they begin to come out on the 18th day it indicates that the average temperature was too high.

If chicks come out weak it indicates either too high or too low temperature, or that the eggs were from immature pullets or overfat hens.

A young chick is naked, like a babe just born, the down being no protection, hence everything depends on plenty of heat. Better have the brooder too hot than too cold. If the chicks are with hens they must have a warm, light place, as a hen cannot raise chicks in winter any better than it can be done artificially, as it is not her natural period of the year for so doing.

No thermometer is needed in the brooder, or under the hen. If the chicks crowd together especially at night, they need more warmth. When they shove their heads out of the sides of the brooder, or from under the hen, the heat is just right. Whenever the chicks do not sleep near the edges of the brooder, but get as close to each other as possible, give more heat.

When the chicks show signs of leg weakness, have clogging of the vent, and bowel disease results, there is a lack of warmth in the brooder, especially at night. The night is when the chicks meet with the greater number of difficulties.

When chicks have leg weakness, and the floor of the brooder is very warm, the cause is too much bottom heat. Bottom heat is excellent for chicks until they are a week old, but after that time there should be only warmth enough on the floor to not have the

floor cold. All warmth should come over the chicks. They feel the warmth on the backs with more satisfaction than on any other portion of the body.

A single night may ruin all. Never let the brooder become cold for an hour. Once the chicks get chilled they never fully recover.

When the chicks seem to be continually crying it means more warmth needed. The warmth is more important than the food.

If the chicks are stupid, drowsy, continually cry, or have fits, look on the heads and necks, and under the wings for the large lice. Also examine for the little red mites.

Hatching should begin in October and end in April or May. The best prizes are obtained in April and May.

It costs five cents in food to raise one pound of chick. The cost of eggs, labor, buildings, etc., are extra. The heaviest cost is in the eggs, (which are high in winter) as they often fail to hatch.

Hens are better than pullets for producing broilers. The males should not be less than ten months old.

Eggs from fat hens, moulting hens, immature pullets, or from hens in the yard with cocks having frosted combs, chilled eggs, very small eggs, will not give good results.

In a majority of cases the failure is due to the eggs and not the incubator.

Never try to save work. One-half the failures occur from parties desiring the incubator to work without attention. Too much faith in the regulator is dangerous. You must always be "on deck."

If rightly managed an incubator will pay for itself the first hatch, but there is more in the man than in the incubator. Brains make an important factor. Learn all you can by observation.

R. W. Davison, Glendola, N. J., says the most important step is first-class incubators, and he adds:

"I always like an abundance of ventilation. Too much ventilation is not desirable, but after the chicks are nearly all out of the shell then we want plenty. I am led to this remark from the fact that I have owned machines that were lacking in this respect; consequently the chicks had all they could do to keep alive, as they use up a great deal of air. Twenty-four hours after hatching they should be placed in the brooders. The brooder is the most important part of the whole thing outside of the laying stock. I prefer a brooder with a good regulator, and, in fact, could not get along without one. I am using (on my coal stove and hot water pipe system) the regulator made by the Prairie State Incubator Co., only I connect the lever bar with a check draught on stove pipe, instead of with the stove lid, as they do. There are individual brooders also with regulators. The best plan is to have individual brooders in a nursery, and regulate the outside temperature with a small coal stove (in winter). After the chicks have been in here about ten days then remove to the regular brooding pens.

"For the first twelve hours run the brooders at ninety-eight degrees, and then for the next ten days run at ninety-four degrees.

"The next two weeks at ninety degrees to eighty-nine degrees, and after that from eighty-eight degrees to eighty degrees. Remember that the degree of heat is the all important, and we should be just as careful here as in the incubator.

"I will, however, go back to the incubator. I do not believe in moisture except after the eggs commence to pip. I have tried it with incubators in a cellar, and also above ground. The egg itself will tell us how to proceed. The evaporation of the egg is the guide. The chick must have room in which to turn itself while cracking around the shell. If too much moisture is used, the chick will grow too large, and being wedged in a house too small for it, will die. The ventilators in the incubator alone are to be depended on for proper evaporation of the egg. Each person will have to determine for himself just how much ventilation to give by frequently looking at the eggs (three or four) and not how the air space is growing. The evaporations should be gradual until by the eighteenth day the air space should occupy at least one fourth of the eggs, (some operators put it at one-third.) The principal of the thing is that the wider we open the ventilators the more air passes through the machine and the more moisture this dry air will extract from the egg. I usually commence by giving very little ventilation the first week, and then, gradually giving more until the eggs are evaporated about right, and then when they commence to pip I give a little moisture, and partly close the ventilators until all are out. Of course the machine will have something to do with this. I now have one machine in which I have to give all the ventilation I can from the start, (the ventilation is poor) while in other machines I run as stated above.

"In cold weather less ventilation should be given than in warm, for the greater the difference between outside and inside temperature the greater will be the amount of air that will pass through the machine. I think we all understand that principal. I have demonstrated, to my own personal satisfaction, that there is money in broilers when it is combined with eggs, or eggs and fruit. There should be not less than twenty acres of land with the plant and the more the better. Just so soon as the people learn all these underlying principles that go to make up the full rounded whole, then, and not till then, will there cease to be failures. One very important point to be considered is that we should aim to have something to sell at all seasons of the year."

"One of the prettiest sights I know of is a brooder full of little chicks from one to ten days old," says a correspondent of the New York Tribune. "I never grow weary watching their graceful motions as they deport themselves in their little playground, industriously scratching in the clean sand, playing at leapfrog or contesting the possession of a toothsome morsel of meat or bread crumb, keeping up meanwhile a ceaseless chatter. The pleasing sight of heightened if they belong to a variety of breeds. But to raise these little animated puffballs is where the work and skill comes in. To bring them safely through all the perils of babyhood and feathering-out—there's the rub. To keep them well is the secret of success.

I know of no more unsatisfactory part of the poultry business than doctoring sick chickens. It is seldom a success. To keep them well they must be kept warm. It is the first letter of the alphabet of successful chicken-raising. I lost heavily at first until I found this out. Fifty per cent or more of each hatch would drop out with bowel disease until three weeks old, and then many more when changing from down to feathers. It was a very discouraging experience. I kept altering my brooders and experimenting until of my last hatches I lost only 1 or 2 per cent, through sickness.

"My great mistake had been in not keeping the brooders warm enough. I now keep them at 100 degrees day and night for about a week until the chicks get a little strength, and then reduce to 95 degrees and then to 90 degrees. Until little chicks are feathered they are but little better than naked, and need a tropical temperature to which they can resort when they feel the least chilled. After they are 10 days' old they will endure a considerable degree of cold if they can run at will into a warm brooder. Any attempt to save kerosene by turning down the lamps is disastrous. It doesn't pay to save oil at 8 cents a gallon and lose chicks that will at 10 weeks old bring 25 to 50 cents a pound. At night the chicks are exposed to the greatest risks, and there must be no mistake about the proper amount of heat. Too low a temperature at night for only a few hours may result in the loss of many chicks.

"For the first ten days they must not be allowed to get far away from the brooder. My brooder house is divided by partitions into sections six feet wide. The brooders, one foot high and three feet square, are set against the back wall, one foot from one partition and two feet from the other. These spaces are floored over level with the top of the brooder, a four-inch board is in front, and inch mesh netting, one foot wide, stretched and fastened to that and the partitions. The chicks are not allowed to go off this platform until ten days old. The first couple of days they are not allowed to go more than a foot from the brooder, and then only for a little time to eat, drink and exercise, and then they are put back in the brooder and kept dark and quiet for a couple of hours to rest and take a nap. In fact, they need much the same treatment and care the babies do. I take a last look at them before I go to bed. If everything is quiet and the chicks lie scattered all over the brooder floor, then the heat is just right. If there is a noise of scuffling and crowding, and the chicks are hugging the center of the brooder, they need more heat at once, or some of them will get under foot and be trampled to death, and bowel disease will put in an appearance. If they lie with their heads outside the curtains, the brooder is too warm, and there is danger of leg weakness. It may be objected that all this watching and care takes a great deal of time, and so it does; but just such watching and care, day and night, must be exercised or else the artificial rearing of chickens will prove a dismal and exasperating failure."

The Poultry Keeper, in taking up the subject, "Why eggs do not hatch," gives some very good pointers, as follows:

"The principal loss with broilers is in hatching, not that the incubators are at fault, but because of the difficulty of getting fertile eggs. There may be "more blanks than prizes." When one must buy four eggs, each costing three cents, the first cost of producing a chick may be more than the whole cost of the food required to carry it to a marketable age. It is on the super-abundance of worthless eggs that all the hopes are shattered. The hatching of chicks in mid-winter, either by hens or by incubators, is something that keeps the operator in doubt until the hatch is over, whether he will have the egg drawer "alive" with chicks or have to carry out the eggs in large baskets to be buried.

"The reasons for the loss of chicks dying in the shell are too numerous to be known, and one of which may be the cause. Neither the hen nor the incubator fails to lose chicks in that manner. The following are some of the causes. Eggs from immature pullets, cock too fat, hens too fat, hens beginning to molt, shells of eggs too thick, cock with frosted comb, cock inactive, feeding highly seasoned food, lack of exercise of hens, exposing the eggs just when the chicks are coming out, lack of bulky food for hens, natural weakness of parents, inbreeding, lack of vigor in male, inherent lack of vitality in chicks, too close and persistent sitting by the hen, thus overheating the eggs; hens once affected with roup, cockerel not matured. The above are only a few causes. If eggs are collected from all sources (as is often done for incubators) it is an utter impossibility to avoid securing eggs that will allow chicks to develop, but which cannot get out. To know the exact cause of failure, in each case, is too much for any living human being.

"The majority of failures are not due to the incubators but from using eggs from fat hens. If an incubator hatches one egg it should hatch all that will hatch.

"One of the mistakes usually made is in supposing that eggs must have moisture; that is, the eggs must be in the presence of damp earth, or resting on it. The eggs under hens are therefore sprinkled, while pans of water are kept in incubators to supply moisture. Recent experiments show that during incubation the moisture (water) in the eggs is rapidly given off, and near the end of a hatch tests show a very large air space at the large end of the egg. The chick does not fill this space, but seems packed in the egg lower down. When too much moisture is given the chick grows more than it should, and becomes too large to remain in the egg and not sufficiently developed to come out. The conclusion is that no moisture is necessary for incubation unless in extremely dry locations, and then not so much with a view of supplying moisture as to prevent too much evaporation from the egg.

"Chicks will die in the shells, however, despite all that can be done, as there are so many conditions regulating incubation which cannot be all complied with. A chick may inherit weakness from its parents, or the eggs used may not be of normal size, or perfect in every respect. If a dozen hens are sitting at one time it will be found that all are not equally successful in hatching. Some will

hatch every egg, while others will bring off but few chicks. Even the temperatures of the bodies of the hens vary. An egg is a wonderful thing, and no one can predict in advance what it will bring forth.

"Eggs from fat hens usually do not hatch, but frequently the eggs are fertile, and all goes well for about ten days, and then—they die in the shells.

"It is now known that eggs in incubators (or under hens) require no moisture at all, but there must be no dry air currents over the eggs."

Plate 6.—CHICK—TWENTY-FIRST DAY INCUBATION

Mrs. Harry E. Hoak, in Farmer's Guide, says:

"There seems to be a feeling among farmers that an incubator is a very complex machine, and that it takes a great deal of skill to handle one, while the truth is there is nothing complex about them, and the average farmer's wife who is willing to spend a share of her time attending to an incubator may be very successful. Right here let me say, don't expect too much, and remember when you read of 95 per cent hatches, it means that per cent of fertile eggs, not of all the eggs put in the machine. It is always better to be agreeably surprised than disappointed.

"It is better to have your incubator in the cellar, especially if the weather is cold, as there is less variation in the temperature there than in the upper rooms. In warm weather we have had very good success when the machine was placed in a room adjoining the kitchen, and it was less trouble to care for.

"When the machine comes from the factory, unpack and put together according to directions. Then take a spirit level and see

that it is level on all four sides. If it is a hot-water machine—that is, one having a tank of water above the egg chamber—the tank must be filled with hot hater at about 112 degrees. Fill and light the lamp and place in position. Place the thermometer on the egg tray and close the machine. When the thermometer registers 100 degrees adjust the regulator and let it run until morning. If in the morning it is still running at 100 degrees it is ready for the eggs.

"And now a word about the eggs: It is far better to have the eggs as nearly uniform as possible, and it is therefore best to have them from one breed or cross. They will all hatch at nearly the same time. They will be a more uniform lot of chicks. They will all mature at the same time. The latter is quite an important item if they are to be sold as broilers.

"To go a little farther back, see to it that the producers of those eggs are strong, healthy hens, that they are mated to vigorous males, that they are not overfed, but are given a variety of food, and that they take the proper amount of exercise. All these details must be attended to if we would be successful. The eggs should be gathered several times a day in cold weather, and placed on racks in the cellar where they can be turned every other day. Use no eggs having ridges around them or any that are ill-shaped, and use those as nearly one size as possible.

"It has been well said that hatching is only half the battle, if, indeed, it is that. In our estimation the great causes of fatality among brooder chicks are lack of exercise and overfeeding. Do not crowd 150 chicks into a so-called 200 size brooder, or you will be sure to lose them. Fifty will be plenty to put in one brooder. When the chicks begin to hatch get your brooders in readiness by heating to 95 degrees. You may gradually decrease the heat in the brooders from 95 degrees the first week to 90 degrees the second week, 85 to 80 degrees the third and fourth weeks, and 80 to 70 degrees the fifth and sixth weeks, and after that no heat will be needed. Be sure your chicks are thoroughly dried before putting in the brooder."

A writer in Wallace's Farmer gives an interesting account of a business of supplying incubator eggs. We reproduce it as follows:

"From November to January there is a demand for incubator eggs. The people who make a specialty of broiler raising cannot, as a rule, produce all the eggs which they need for the purpose. The poultry man who has succeeded in making the fact known that he understands how to care for his flock in order to make it produce a reasonable per cent of fertile eggs can build up a permanent trade in this line which will be exceedingly profitable. He must confine himself to a breed however, which is approved by the broiler raisers. The Plymouth Rocks and the Wyandottes are good broilers, the latter being the preference of the majority of those engaged in the business. Eggs from mixed lots of hens are not in demand for this purpose as the product will lack uniformity, and to a greater or less extent will be deficient in the broiler-making qualities. As broiler raising is not carried on to any large extent except in the neighbor-

hood of the large cities of the East, it might be supposed that there would be no sale for incubator eggs in the West. This writer lives in northwestern Iowa, and we are just finishing out a contract for five hundred incubator eggs to go to New York. When that is completed we have another to begin on for California. We get five dollars a hundred for the eggs delivered to the express office here. We look upon it as a good winter business, and propose to put ourselves in a position for carrying it on on a larger scale. The New York order would be duplicated if we had the facilities for filling it. We have the breed which exactly suits this customer and the shipments which we have sent to him heretofore seem to have been very satisfactory. If this were not the case he would not send eight hundred miles for our eggs. There must be scores of egg farmers in his own neighborhood who keep the same breed that we keep. We are not telling what breed we keep, as that would lay us open to the suspicion of trying to use the reading columns of the Farmer to further our private interests, and, as a matter of fact the breed cuts no important figure in the case so long as it is confined to the list which is generally endorsed by those in the broiler business. The broiler raisers, like the egg farmers, are not a unit in their opinions as to which is the best breed for this purpose. Some of them no doubt would not accept our eggs as a present, as they have an established trade with calls for a product altogether different. The thing for the egg farmer to do is to find out who wants eggs of his kind, and then be so careful and painstaking in filling the orders when he has succeeded in getting them that the customer will feel secure in giving him more of them every year. You cannot put a business of this kind solidly on its feet in one or two seasons, but in the course of time it will be something worth striving for if the power behind it knows how to make it go."

The Maine Experiment Station, Oronto, gives some good matter in its reports of trials made with artificial methods. Its report says:

"Incubators have been so much improved that there are several kinds on the market that we feel sure will hatch as many chicks from a given lot of eggs as can be done by selecting broody hens. They require little care, maintain an even temperature, and are easily adjusted to meet the increase in temperature arising from developments going on in the eggs. In some machines the moisture supply is automatic and adapted to the requirements. In others it has to be supplied, and skill is necessary in determining the quantity needed. The economy of the incubator is very great. A 360-egg machine will do the work of nearly thirty broody hens, and can be kept at work continually, if desired.

"We use indoor brooders, mostly, and very much prefer them to any outside brooders we have ever seen in use. The portable brooder houses are built on runners so that they may be readily moved about. The houses are twelve feet long, some of them are six and others seven feet wide. Seven feet is the better width. They

are six feet high in front and four feet high at the back. The frame is of 2x3 inch stuff; the floor is double boarded. The building is boarded, papered and shingled all over. A door, two feet wide is in the center of the front, and a six light, sliding window is on each side of it. A small slide is put in the door, near the top, by which ventilation may be obtained early in the season, before the windows can be kept open. Since shingles on the walls near the bottom are liable to be torn off in moving the houses, double boarding on the walls would be preferred. Two brooders are placed in each of these houses and fifty to sixty chicks are put with each brooder. A low partition separates the flocks while they are young, but later it has to be made higher. The houses are large enough so that a person can go in and do the work comfortably and each one accommodates one hundred chicks until the cockerels are large enough to be removed.

"In the Fall these houses are grouped together, twenty or thirty feet from each other, so as to make the care of the young chicks convenient in early Spring, while the brooders are not in use.

"About the 20th of June, the grass is cut on some field near the main poultry or farm buildings, and the brooder houses are drawn out, with their contents of chickens, and located fifty to seventy-five feet from each other, in line, so that they may be reached with little travel. The chickens are shut into small yards, adjoining the houses, for about a week, after which they are allowed to run together. They mostly keep to their houses, although they wander away quite long distances during the day, returning at feed time, and at night.

"When the chicks are thirty to forty hours old they are carried in warm covered baskets to the brooders, and fifty or sixty are put under each hover, where there temperature is between ninety-five and one hundred degrees. The temperature is not allowed to fall below ninety-five degrees the first week, or ninety during the second week; then it is gradually reduced according to the temperature outside, care being taken not to drive the chicks out by too much heat, or to cause them to crowd together under the hover because they are cold. They should flatten out separately when young, and a little later lie with their heads just at the edge of the hover. Under no condition are they allowed to huddle outside of the brooder. They huddle because they are cold, and they should be put under the hover to get warm, until they learn to do so of their own accord. Neither are they allowed to stay under the hover too much, but are forced out into the cooler air where they gain strength in the day time. They are not allowed to get more than a foot from the hover during the first few days; then a little farther away each day, and down onto the house floor about the fourth day, if the weather is not too cold, but they must come out from under the hover frequently.

"The floor of the brooder is cleaned every day and kept well sprinkled with sharp, fine crushed rock, known in the market as 'chicken grit.' The floor of the house is covered with clover leaves,

or hay or chaff, from the feeding floor in the cattle barns. For raising winter chickens the long piped brooder house is indispensable, and it has many advantages when used at any season of the year. The advantages are especially great when raising chickens if April or May prove to be cold and wet, for then the small houses are apt to be cold outside of the brooders.

"The expenditure is greater for the piped house, for the reason that colony houses should be provided in which the chickens may be sheltered after they leave the brooder house. In ordinary seasons we experience no difficulty in raising April and May hatched chicks in the small houses. With proper feeding, pullets hatched in these months are early enough to do good work throughout the year."

CHAPTER VI.

Pointers on Feeding, Value of Feed Stuffs, Together With Numerous Bills of Fare.

Chick grit should be about the size of coarse sand. See that the chicks have it constantly before them.

Do not put meat scraps in the mash the first week.

Hard-boiled eggs and wet cornmeal do more harm than good to young chicks,

Keep the chicks busy. Scatter millet or canary seed among some light scratching material.

Powdered charcoal—a teaspoonful to a quart of feed—should be given daily.

Lettuce, onion tops and lawn clippings, all cut fine, make the best green diet.

Be careful to neither overfeed nor underfeed.

It is very important to have regular hours for feeding.

Don't have a feast to-day and a famine to-morrow.

Give fresh water twice a day during hot weather.

Be sure to scald the drinking fountains thoroughly once a week during hot weather.

Scatter the grain so that the "bullies" in the flock cannot crowd out the more timid ones.

It is well for all to understand, writes James Rankin, that chicks can be forced to a greater weight in a given time, when hatched and grown artificially, than can possibly be done under hens.

J. H. Drevenstedt says the crop of a week-old chick holds less than a teaspoonful, and if filled at sunset will be exhausted long before sunrise, and hunger for an hour means a day lost in growth.

"Little and often" is a good rule in feeding.

According to the New York Agricultural Experiment Station, the cost of food, per chick, to weigh one pound, on ground grain, is three cents; on whole grain, three and seven-tenth cents. After making repeated tests in feeding, the Station concludes: The ground grain ration proved considerably more profitable than the whole grain ration with the growing chicks.

Beware of sour food. Always throw away all soft food not consumed.

For chicks, clover meal is better than clover hay.

W. R. Curtiss & Co., Ransomville, N. Y., believes in feeding broilers five times a day in the start, and later three times.

J. H. Seeley, formerly manager of Ex-Vice President Morton's New York broiler plant, says he finds there are less losses among

chicks when fed on dry feed, but he likes a variety—say cracked wheat, cracked corn, and cracked oats, or hulled oats. But when it comes to fattening, he prefers scalded feed.

F. Bause, New Berlin, Pa., keeps fine grit and oyster shell on the brooder floor. The feed for the first ten days are equal parts bread crumbs, bran, rolled oats and millet seed. After ten days equal parts cornmeal, bran and sifted oat feed, and five per cent meat meal.

J. E. Stevenson, Columbus, N. J., says, when obtainable, he feeds stale baker's bread, moistened in milk, for the first week or two. Then he gradually changes to cornmeal, wheat bran, ground oats, equal parts, and ten per cent of ground meat, moistened to a crumbly mass; with cracked corn, wheat, etc., once or twice a day. He begins by feeling every two hours, or even less, and feeds five times a day until ready for market.

William H. Child, Glenside, Pa., says he starts his chicks on rolled oats, dry, and when they are a week old gives them a mash made of American Poultry Food, clover meal and animal meal. He feeds five times a day at first, quantity only such as they will clean up promptly, gradually decreasing the number of times he feeds as they grow older. He adds powdered charcoal to the mash twice a week, and keeps grit and water at hand all the time.

William H. Jones, Lincoln University, Pa., says the first three days stale bread soaked in milk and squeezed dry is kept before the chicks. On the fourth day he commences to feed one part each of meal, bran, brown middlings, Western ground oats; thoroughly scalded, and given four times a day until two weeks old. Then to the above mixture he adds a part each of cut clover hay and meat meal, up to eight weeks of age. Then he leaves out the bran, and makes it two parts cornmeal, and in place of oats adds cotton seed meal until the chicks are ten weeks old. He keeps before them charcoal and grit.

George G. Harley, Hammonton, N. J., one of the most practical broiler experts in the country, says the first day he gives nothing but wheat bran to peck at. The next day he feeds rolled oats, and continues to feed it until the chicks are ten days old, keeping dry bran, charcoal and fine oyster shell by them all the time. He feeds every two hours, just what they will eat up clean. After ten days he feeds a moist mash in the morning and evening, composed of cornmeal, middlings, bran and ground oats, with meat scraps in proportion to the age of the chicks. At noon he feeds wheat or cracked corn, and keeps green stuff by them, so they can eat all they want, until the last two weeks. Then they are fed all the celery they can eat. Mr. Harley was the originator of celery-fed broilers which had such a big sale in Washington, D. C., some years ago.

Henry Nicolai, Hammonton, N. J., one of the pioneer broiler raisers of this country, fed dry cornmeal for the first three or four days. Then he dampened a very little of it and added some well-cooked potatoes chopped up very fine. After two or three weeks he gave scalded feed—cornmeal (plenty of it), a little bran, second

grade flour or middlings, and a little ground meat. For the first week or ten days he fed five times a day; after that, three times.

In an experiment conducted at the Purdue (Indiana) Station chickens fed milk and grain made an average weekly gain of 4.46 ounces, while those receiving no milk gained but 2.62 ounces per week. The growth of the milk-fed chickens was more uniform as well as more rapid. The general result seemed to show the beneficial effect in every way of the skim-milk.

It is not possible for all to give their chicks unlimited range, says Ohio Poultry Journal, and in such cases the feeder will have to make up the deficiency by feeding bone-forming elements. The best of these is green cut bone.

William C. King, Hopkinton, Mass., says he feeds no meat food to baby chicks until they are four weeks old. After that about ten per cent of the mash food is composed of meat in some form as long as he keeps the bird. He has found that an over-supply of meat fed to stock in confinement is apt to cause a watery discharge from the bowels, but birds on free range can stand nearly any amount.

Geo. Hall, East Islip, N. Y., says in feeding green cut bone, about a half ounce can be allowed for half-grown chicks, but little ones should not have over an eighth of an ounce each.

When the chicks have good appetites, but weak legs, the chicks moving about on their knees, it denotes too rapid growth. A teaspoonful of citrate of iron and ammonia (a solid) in each quart of drinking water, is recommended.

Dr. G. M. Twitchell, before the Massachusetts State Board of Agriculture, said:

"In no place is skimmed milk more valuable than in growing chicks. In my own experience I found the best ration for market poultry to be thirty per cent of oats and wheat, twenty of corn and ten of linseed all ground together and ten of meat scraps added. This mixed into a dough with skimmed-milk I would bake until thoroughly cooked, set away for a day or more and then pound fine and feed. In this combination I consider linseed one of the most valuable parts, it is rich albuminous food and hence valuable in forcing growth. If these chicks were intended to furnish future layers I would change the ration to meet the changed condition. No matter how choice the stock, how careful the breeding, how well balanced the ration, unless regularity be observed in feeding it is utterly useless to expect to succeed. Hunger must be appeased at once, or the system draws upon its own stores for nourishment. If regular hours are observed nature adapts the animal to the condition. Green food must be supplied liberally, and for want of this many broods are lost. A good plan is to sow oats or rape-seed in boxes, and cut when two or three inches high, chopping fine and feeding freely."

Frank Y. Hopping, tells in the Germantown Telegraph, how he feeds chicks to get big broilers for the early market. He says: "I have found the following method of feeding chicks for broilers the

best: The first week I give cracked wheat, then after that I give a mixture of ground oats and corn, equal parts, about a fourth part of middlings, and a handful of ground meat. The whole mixture is scalded several hours before feeding, and then fed only moist. Also chopped up cabbage, boiled or raw potatoes and other vegetables, feeding either separate or in with the mash. Whole wheat or cracked corn is also fed between meals. The mash is fed morning noon and night, and the same continued until ready for market, the supply of meat, however, being gradually increased the older they become. Coal ashes, charcoal and ground oyster shells are constantly within reach."

M. Sumner Perkins, in Farm Journal, says:

"For twenty-four hours the chick needs no food whatever, and is better off without it. For the first two or three weeks, a mixture of hard boiled eggs and bread crumbs, moistened in sweet milk is as good as anything. Eggs are first-class food, if not fed too plentifully, in which case they are very liable to produce diarrhoea. Oatmeal is another very nutritious food, and it may be either boiled to the consistency of a stiff pudding, or it may be mixed with other grain and baked into a cake. Waste bread from hotels can be purchased cheaply. This contains beside common wheat bread, a species of corn cake that forms splendid chicken food. Corn cake can easily be made by anyone by mixing a little shorts with corn meal, preparing and baking the same as in the case of ordinary family bread. Milk in all its forms, is much relished by all classes of poultry. Chickens when allowed plenty of the same, can well-nigh be seen to grow. The bones and frame-work under such a diet develope rapidly and perfectly. As the chicken grows older, cracked corn, oats, wheat, barley and buckwheat, can all be used with profit. The greater the variety in the food and manner of feeding, the better it is.

"Animal food must always be supplied, a little at first, the quantity to increase with age of the chicks. Beef trimmings, livers, hearts, etc., of sheep and cattle, when boiled and finely chopped will fill the bill. If the prepared beef scrap of commerce be relied upon, care should be exercised to buy one the best grade. A greasy, mouldy article is in no wise suitable for chickens, and disease will surely follow the use of such. The tender heart of a cabbage, clover cured when in full bloom, steamed and finely chopped, potatoes and other roots, will supply acceptable vegetable food.

"Coarse sand, bits of charcoal, cracked oyster shells and broken bones, should always be in reach as each of these substances has its own use.

"To sum this whole matter of winter chicken-raising up in a nut-shell, select vigorous, breeding stock, incubate only large perfect eggs from the same, place the chicks soon after hatched in a good brooder, comfortably warmed, feed well upon a variety of nourishing and natural food, keep all appurtenances scrupulously clean, and the chickens will take care of themselves. It must be borne in mind that the chick in winter is wholly dependent upon the

attentions of the attendant for everything it receives, so that no detail of proper management must be omitted."

R. W. Davison, in Agricultural Epitomist, says:

"Some people claim that it is easier to hatch chickens than it is to raise them. No doubt that in such cases the brooder or way of managing is to blame. It must be remembered that the chicks come from the incubator where the temperature is anywhere from 100 to 105 degrees, (the heat ought to be run down to 90 or 95 degrees after all the chicks are out of the shell) so that it will not be advisable to put them in a cold brooder or cold room. For the first ten days, not longer, the brooder ought to stand in a warm room or where the outside temperature does not fall below 65 degrees. This will prevent the little fellows getting chilled if they should stay outside of the brooder too long. If the outdoor brooder is used then they can be confined to it for the ten days if not too crowded; thus the warm room will not be so necessary. To prevent the chicks from wandering away from the brooders too far at first stand up five inch wide boards forming a little pen along the front of the brooder. When the chicks get large enough to jump over they can be removed.

"While the food is a very important consideration with brooder chicks, the manner of giving it is just as important. Now the question of exercise should not be overlooked. These little fellows should be taught to exercise when a week old. Each little pen should have litter in it. If it can be had there is nothing better than clover hay chaff—the leaves, heads and seeds that shake off in handling the hay. Next to clover chaff comes cut straw, cut in half-inch lengths. Do not have the litter too thick on the floor at first, say half an inch deep, but as the chicks grow increase the depth. Induce scratching by scattering a little cracked wheat or millet seed in the chaff. This exercise will keep the body healthy and prevent leg weakness. It must be remembered that brooder chicks do not have all outdoors to run in, neither do they have a mother to teach them this 'fine art.'"

Arthur G. Duston, of Marlboro, Mass., has been very successful in growing broilers. He advises that care must be taken not to get the chicks chilled in transferring from the incubator to the brooder.

For the first week, warmth is considered more essential than food.

At the close of their first day in the brooder they are given a feed of rolled oats. Next morning they get more rolled oats with a dish of warm milk to drink. The milk is fed from a can fountain, made from an old fruit can notched at the lower edge, which is filled and inverted on an old saucer not much larger than the can. Some chicks that will not eat, will take to skim milk, and it gives all a fine start. Powdered charcoal is kept near them as a regulator. The young chicks are fed every two hours. The first week they get rolled oats, millet seed and corn cracked very fine. Skim-milk is kept before them all the time and the milk dishes washed

Plate 7.—WILLIAM E. RICE, Pigeon Expert.

twice a day. Mr. Duston finds it pays well to feed skim milk. He is able to buy it at 5 cents for 8½ quarts. The sand floor of the brooder is kept clean.

The second week the feed is about the same, except that they are fed a little dough, one-third cornmeal, two-thirds bran seasoned with a little salt and pepper and mixed with boiling water. This mash is made semi-dry, not sloppy. The soft food and grains are fed alternately. The third week, they get a change in the shape of cracked wheat alternating with the other grains. The chicks are allowed to run on the ground outside when they are a week old, and after the second week they go out every day unless it is stormy. When outdoors during the cold weather they are made to exercise by driving them around, or by feeding them a handful of millet seed.

The program of the third week is continued for four weeks as follows: Early in the morning a feed of hard grain, then a feed of chopped, raw potatoes made by pulping them in a meat chopper. A little later is given a feed of raw cabbage cut in strips. At nine o'clock a feed of scalded mash as previously described. This is fed on tin plates 14 in. in diameter and ¾ in. deep. These are cleaned by a small shovel before another feed. The leavings are not fed again but go into the swill tubs for the pigs. Two hours later another feed of mash is given and again at one o'clock and at three o'clock. There are plates enough so that all the chickens have their chance. The dish is taken away before the chickens have eaten quite all they would like. The last feed at five o'clock, or just before dark, is fine cracked corn.

When this program has been continued four weeks, the chickens are six weeks old, and they must be finished off in ten days or two weeks to weigh two pounds and to show good color and appearance. To get the most color and flesh in the least time the corn meal and bran mash previously described is thickened by adding all cottonseed meal that can be stirred in, also adding a little cheap molasses. This feed will give a fine yellow skin, but if continued more than two weeks the chickens will get "off their feed," and lose flesh and health.

This ration should only be given to finish them for market. The chickens are made to eat all of it they possibly can and not lose their appetite. For making roasters the regular feed is continued up to the last two weeks. This high feeding method is not considered desirable for raising breeding stock, but only for chickens for market.

In 1892 we gave our experience in Farm-Poultry, Boston, Massachusetts, from which we make the following extracts:

An incubator may hatch ever so well, and a brooder do the finest kind of hovering, yet if the chicks are not properly fed, there certainly cannot be any kind of success. Good feeding tells. There is no fixed bill of fare. and in taking up this subject, we can only give our own experience, and what we have observed on other farms in Hammonton.

As is well known the chick comes from the shell without the least bit of appetite. Scientists say that nature has given it the power to absorb the contents of the yolk prior to its coming out of the shell, consequently it is not necessary to give any food for at least twenty-four hours. Some writers say thirty-six hours after hatching is early enough for the first feed, but we always dish up the first meal after they are a day and a night old. After we hatch out the chicks we put them in a nursery where we keep them for the first ten days or two weeks. After that they are removed to the regular brooding-house. Upon the floor of this nursery we cover about a half inch of bran, so that when the chick is ready to eat, it will find some food right before it. Then, in a little trough we place rolled oats, or pin-head oatmeal, and subsequently begin, say about a week afterwards, a mash feed. We might as well here add that we also give stale bread-crumbs to alterate with the rolled oats, until they have their stomachs more fortified for heavier food. Some of the broiler men in this town grind up, or finely crack, whole wheat, which they feed instead of the rolled oats. We like both methods, but think more favorably of the oats diet. We also give boiled milk as a diet.

Some writers think that for the first few days it is best not to give any water. We differ. Deprive the youngsters of something to drink and they will fairly gorge themselves when allowed to get to the water. We do not, however, start with water; we boil milk, and give that instead.

There used to be an opinion that hard-boiled eggs was the best food to start with, but we think that too much reliance had been placed upon that diet. It has been proved beyond a doubt that an excessive use of hard-boiled eggs will produce bowel troubles. There can be no harm in a judicious use of them, but we have found more virtue in saturating bread-crumbs with a fresh egg.

Two parts of bran, and one part of corn meal, scalded several hours before using, is an excellent food after the chicks are a week old. But two parts bran, and one part each of corn meal and ground wheat is better. A little of meat scraps—say a handful to a pail of the above mixture—should also be added.

After two weeks of age, cracked wheat and cracked corn makes a substantial meal. From the start, grit of some kind must be within reach. Some use fine flint; some finely cracked oyster shells; and some fine gravel. It matters not what kind is used. Powdered charcoal should also be kept in a little box in the pen so the chicks can help themselves.

Green food, as chopped up onion tops, or cabbage leaves, are very beneficial. Lettuce can be raised early in the season in hot-beds, and a better and more tender plant cannot be found. Where greens are scarce, roast potatoes, cut into halves, furnish a grand substitute; and even when greens are fed, it gives an extra treat.

Corn meal, in some form or other, is the "staff" upon which to grow good broilers. It can be used in regular johnny cakes, or what is known as southern corn bread.

We might add, also, that we never give milk to the chicks until it is boiled. There is less likelihood of having any evil effects from it. We have known of bad cases of bowel troubles coming from feeding fresh milk.

George W. Pressey, of Hammonton, who, with the assistance of his two daughters, raised and marketed nearly 5,000 chicks in a single season, used this plan of feeding:

When the chickens are twenty-four hours old, feed them with baked corn cake made as follows: Three quarts corn meal, one quart wheat middlings, one quart of meat meal. Mix quite stiff with water or skimmed milk, in which have been mixed four tablespoonfuls of vinegar, and two teaspoonfuls of soda. Bake, and when cold, crumble fine and feed for the first week all they will eat, or during the time they are kept in a warm room, which must never be over ten days, or they will sicken and die for want of pure outdoor air. For the first week they should be fed once a day with mashed potatoes, given plenty of water to drink and plenty of coarse sand. The food for outdoors is two parts corn, one part wheat, and one part oats, ground together quite fine. To each ten quart pailful of this mixture add one quart of wheat bran, half a cup of pulverized bone meal, one pint of middlings, and a pint of meat meal. Mix rather dry with hot water, and leave for two hours before feeding, to give it a chance to swell. With this food, he also, once a week, gives a half teaspoonful of salt, and in cold weather a quarter teaspoonful of red pepper; and once or twice a week he adds a spoonful of sulphur; and about as often, mixes in the drinking water for the day, a spoonful of Douglas Mixture to every one hundred chickens. Powdered charcoal is kept before them all the time.

At first it is best to feed the chicks every two hours, all they will eat up clean. After about two or three weeks old they can be confined to three meals a day. The first feed of the day should be given at daybreak, and the last feed a little before they are ready to creep in their brooders for the night.

Great care must be taken in the preparation of the food. It must not be sloppy, neither hot. It should be just moist enough so as to be easily crumbled, and warm.

Food must be given in troughs. If thrown upon the floor it will be trodden under foot and wasted.

It must not be forgotten that the methods of feeding herein given are for broilers alone. In raising birds for breeding purposes, more attention must be paid to growth of bone and muscle than fat.

With regularity in feeding, and a regular warmth in the brooders, two-thirds of the troubles in raising chicks can be avoided. As brooder-raised birds are free from lice, and are never troubled with gapes, it shows that if there is a failure in the method, it must be though the instrumentality of the man. As we have said before, good brooders and good food are everything. It is much easier to hatch the eggs than raise the chicks.

For several years we have given a test of F. P. C. Chick Manna as the exclusive food for young chicks up to ten days of age. We

have found it excellent, it being a regular "Mellin's Food" for them. Just what this Chick Manna contains we do not know, but we do know that by its use we have had stronger chicks, quicker growth, and less loss than by anything else that we ever fed. This is a rather strong testimonial, and it is given without the knowledge of the manufacturer, but we deem it our duty to speak of a meritorious article when we find one.

In an experiment made last year with Spratts Patent Poultry Meal, we also had excellent results. The article in particular that we used was Spratt's Chick Meal, No. 5, which is a cooked food manufactured by Spratt's Patent for the special purpose of rearing young chicks from the egg to maturity, but in the broiler business its use is recommended for a few days or say until the end of the third week, after which its use may be gradually discontinued, but this is only on account of the expense.

In a personal letter to the writer, T. Farrer Rackham, East Orange, N. J., says:

"It is all very well for the mixed grain advocates to claim that a young chick does not want cooked food, but twenty years of practical experience has proved to me that you can rear a heavier percentage of better and bigger chicks if they are started on a cooked food, than you can under any other circumstances, and if there is any living man that doesn't believe it, I am willing to enter into a contest with him, and can back my opinion pretty heavily before I stop. Of course, I feed grains alternating the feeds: Spratt's at one feed and the grain at the next.

"The man who mixes together a certain number of dried grains claims that these are the foods and that they do better on them. This is all buncombe. There is just enough truth in it to bear out the old adage: 'little knowledge is a dangerous thing.'

"Young chicks in their wild and natural condition do not eat cooked foods, but then they are not hatched during the months of October and March, and they are hatched at a time when the surroundings are full of things that can only be imitated by cooked foods."

Some interesting data on the subject of feeding chicks, is also given in the report of the Maine Experiment Station, as follows:

"For feed for young chicks we make bread by mixing three parts cornmeal, one part wheat bran, and one part wheat middlings or flour, with skim milk or water, mixing it very dry, and salting as usual for bread. It is baked thoroughly, and when well done, if it is dry enough so as to crumble, it is broken up and dried out in the oven, and then ground in a mortar or mill. The infertile eggs are hard boiled and ground, shell and all, in a sausage mill. About one part of ground egg and four parts of the bread crumbs are rubbed together until the egg is well divided. This bread makes up about one-half of the food of the chicks until they are five or six weeks old. Eggs are always used with it for the first one or two weeks, and then fine sifted beef scrap is mixed with the bread.

"It may be that the bread is not necessary and that something else is just as good. We have tried many other foods, including several of the most highly advertised prepared dry chicken foods, but as yet have found nothing that gives us as good health and growth as the bread fed in connection with dry broken grains.

"When the chicks are first brought to the brooders bread crumbs are sprinkled on the floor of the brooder, among fine grit, and in this way they learn to eat, taking in grit and food at the same time. After the first day the food is given in tin plates, four to each brooder. The plates have low edges, and the chicks go onto them and find the food readily. After they have had the food before them the first one or two weeks, the plates are removed. As they have not spilled much of it, they have little left to lunch on except what they scratch for. In the course of a few days light wooden troughs are substituted for the plates. The bottom of the trough is a strip of half inch board, two feet long and three inches wide. Laths are nailed around the edges. The birds are fed four times a day in these troughs until they outgrow them, as follows: Bread and egg or scrap early in the morning; at half past nine o'clock dry grain, either pin head oats, crushed wheat, millet seed or cracked corn. At one o'clock dry grain again, and the last feed of the day is of the bread with egg or scrap.

"Between the four feeds in the pans or troughs, millet seed, pin head oats and fine cracked corn, and later whole wheat, are scattered in the chaff on the floor for the chicks to scratch for. This makes them exercise, and care is taken that they do not find the food too easily.

"One condition is made imperative in our feeding. The food is never to remain in the troughs more than five minutes before the troughs are cleaned or removed. This insures sharp appetites at meal time, and guards against inactivity which comes from overfeeding.

"Charcoal, granulated bone, oyster shell and sharp grit are always kept by them, as well as clean water. Mangolds are cut into slices, which they soon learn to peck. When the grass begins to grow they are able to get green food from the yards. If the small yards are worn out before they are moved to the range, green cut clover or rape is fed to them.

"After the chickens are moved to the range they are fed in the same manner, except that the morning and evening feed is made of corn meal, middlings and wheat bran, to which one-tenth as much beef scrap is added. The other two feeds are of wheat and cracked corn. One year we fed double the amount of scrap all through the growing season and had the April and May pullets well developed and laying through September and October. To our sorrow they neatly all molted in December, and that month and January were nearly bare of eggs."

CHAPTER VII.

Drooping Wings in Chicks—Roofing the Brooder Houses—Bowel Troubles in Young Chicks—Dressing for Market—Raising Stock Birds.

Complaint is time and again received that the wings of some of the chicks being grown for broilers grow too fast, causing the birds to droop and die. We wrote to a number of poultrymen on the subject and secured the following replies:

F. Bause, New Berlin, Pa.; "I pull the large wing feathers as soon as the chicks droop."

Aug. D. Arnold, Dillsburg, Pa.: "I find the use of sweet milk the best preventative for drooping wings in chicks. Give milk instead of water to drink."

Whiting Farm, Holyoke, Mass.: "We do not consider it necessary to clip the wings, as the chickens will do fully better without this. Where such a course is necessary, the food ration is usually at fault, or other conditions."

W. Theo. Wittman, Allentown, Pa.: "Most people believe that it is the wing feathers that grow too fast, or are abnormally developed. This is not it; the chick has not grown fast enough. Hence, anything that stunts the growth helps to develope this wing trouble, and in most cases it is a matter of the wrong kind of feed. Chicks from eggs laid by inbred or closely confined stock are apt to come that way."

W. W. Kulp, Pottstown, Pa.: "I cut (never pull) the wing feathers and tail. I cut them before they droop, as it is easier to prevent than cure. If you pull them you might injure the socket where the feather grows. A new feather will grow in the socket, but it will generally be without color. Nature seems to say it is hard work to grow a feather after such treatment, without putting it in color."

C. E. Howell, Elmira, N. Y.: "We make it a practice to clip off the ends of the flight feathers on all chicks when they are about ten days old, and think it is a great help in a general way, for it retards the growth of the wings. However, if the wings grow faster than the remainder of the chick, there is always a cause. The three principal causes of the trouble are, 1st,their feed; 2d, improper heat or exposure; 3d, lack of exercise. With a close watch on these essential points, very little trouble will be found with the chick's wings."

George H. Northup, Raceville, N. Y.: "Feed often and regularly on nourishing food, not more than the chicks will eat readily. Accustom them to a variety of foods as early as possible. When chicks get weak I have found clear cornmeal, moistened with raw egg (just enough egg to make it crumbly) excellent to revive them, but think it would not be good for a steady food. I do not have any trouble with chicks getting weak if they are well fed, regularly. They grow rapidly, but are so hardy that they do not weaken. I think that when the wings of chicks outgrow some other parts of the body, it indicates a state of partial starvation. Small chicks need more carbonaceous food to keep up warmth and vitality, than mature fowls, proportionally. Therefore, one need not feed sparingly of cornmeal or cracked corn, but as I said before a mixed diet is needed."

An anonymous writer makes a number of good points, as follows: "Is it the rapid growth of the wing feathers which cause the chick to droop? Is it not that the body fails to develop as it should? Don't you think there is something wrong in the management that produces such forlorn specimens of chickhood? Some people clip their wings. Why. I cannot imagine. If they are too heavy for their owners to carry around in their normal position, the best plan in my opinion is to dispose of the chickens; they won't amount to much if they do live to maturity. Compare that chick whose wings hang loosely at its side, with one who carries them folded close to its body Take them in your hands, notice the difference in the weight, feel how sharp and boney is the breast of one, and how plump the other. Look at their legs—it will take both of the one to equal in size the strong, thick shank of the other. How weak the bird is; it scarcely moves when you grasp it. And the other: Why you can feel every muscle struggling in your hands. It is full of life and strength. Give them their liberty: The droopy one goes a little way and stands exhausted. Those dreadful wings seem to bear him down to the ground. The other chick darts from your hands the moment you relax your hold, and flies from the restraint which was so hateful to his vigorous little body. Don't you think it would be cruel to prolong the existence of a chick so puny that it cannot sustain the weight of its own feathers? It certainly will not pay to raise it."

W. A. Penfield, Waterville, N. Y.: "Prevent by proper ration of animal food."

M. A. Summers, Lewisburg, Ky.: "When wing feathers grow too fast I trim them with a pair of scissors."

W. H. Card, Bristol, Conn.: "I out-breed, and have no trouble that way."

J. A. Ainge, Dover, N. J.: "When three weeks old I cut off the wing feathers and find it successful."

B. A. R. Stocker, Wyoma, W. Va.: "Trim off the long feathers; give bone meal."

C. A. Young, Prescott, Wis.: "It has seemed to me that this condition occurs most frequently, if not altogether, with those chicks

that seem below par in vitality when hatched. All the chicks I have this season were incubator-hatched, and the earlier ones have done much better in this respect. The last hatching appeared deficient in vitality, did not grow well, while many of them developed this wing peculiarity and soon died."

W. J. Gordon, Pickering, Ont., Canada: "Drooping of wings is not caused by overgrowth, but by improper treatment, such as crowding at night, small range, poor feeding and lice."

There being a difference of opinions regarding the best roofing for a brooder house, we directed inquiries to a number of poultrymen, with the following result:

Henry Nicolai, Hammonton, N. J.: "My experience has taught me that shingles are the cheapest and best in the end. They will last many years longer by giving the roof a coat of paint costing about one dollar per gallon, and using No. 3, 18-inch cedar shingles. One thousand shingles will cover about 145 square feet; one gallon of paint will cover 250 square feet."

C. E. Howell, Elmira, N. Y.: "I consider shingles the best roofing, but do not use them unless the house can be ceiled overhead with matched lumber. This makes a warm, dry covering, and shuts off the overhead draughts. The cheapest roof I have is building paper well covered with tar and gravel, but it needs renewal of the tar quite often."

George G. Harley, Hammonton, N. J.: "My experience with roofing is that either cedar or cypress shingles is the best for either a brooding or a poultry house. The Red Rope Neponset paper, however, is a very good substitute if it is put on right. It should have one-third lap and painted before the strips are put on. I use ⅞ in. half round strips, and place them two feet apart on top of the Neponset after it is painted. If the strips are put on before painting, the paper will rot under the strips. But I prefer shingles to any substitute."

J. E. Stevenson, Columbus, N. J.: "The best is probably cedar shingles, and they may be really the cheapest in the end. The cheapest and best for a cheap roof, that I have found after several years' experience with the different roofing felts, is ordinary burlap. Tack it on the roof smoothly, and coat well with tar and sand. This will be found much more satisfactory than the majority of felt roofs, as it does not crack nor blow off, and if kept well tarred and sanded will last for years. Old bags will answer the purpose providing they have no holes in them, or the holes are patched, though new burlap would be less work to put on smoothly and can be bought cheaply."

Ezra Cornell, Ithaca, N. Y.: "I suppose that there are some kind of roofing papers that are cheap and will last for some time, but I have never considered them. My houses are all shingled and are perfectly satisfactory. They are waterproof, and at the same time sufficiently open to allow all gases to escape. With the shingle roof I do not consider a roof ventilator necessary. Besides these

qualities a good shingle roof will last for years, is cooler than almost any other roof in summer, and sufficiently tight in winter, as the shingles shrink in hot, dry weather, making the roof open or porous, and swell in damp, cooler weather, making it tight. On the whole, I think it cannot be beaten."

F. Bause, New Berlin, Pa.: "The cheapest roof I have is the heaviest quality tar paper on rough boards, coated with a good, coal tar cement."

William H. Child, Glenside, Pa.: "I have never used anything but ordinary black roofing felt. It has always answered satisfactorally, and I should use it again. When it gets worn, I put a new lot right over the old."

W. Theo. Wittman, Allentown, Pa.: "The best and cheapest roofing for a poultry house is tar or roofing paper well painted with hot tar, and annually painted late in autumn. This makes the roof at its best when most needed. If the tar is applied in spring or summer, the sun will rapidly evaporate it and make the roof thin. With such a roof the roosting room (of the hen house) only needs to be ceiled with matched lumber (as should also be the brooding house) leaving an air-space, as one-inch boards covered with paper in zero weather makes the roof cold, and chills the whole house."

W. M. Rand, Franklin, Ind.: "I don't consider there is any good whatever in cheapness of any kind in the chicken or any other business. Cheapness in the start means unnecessary expense in the end. I built a brooder house on the cheap plan to start with. It proved a failure, and since then have built it all over. This is where the unnecessary expense comes in. If built right at first, there would have been no unnecessary expense of re-building. I first built my house with three-inch battens, three inches apart, with shingles on top for a roof. The consequence was, when the wind blew strong, there was no such thing as keeping up heat. A roof that will shed rain won't keep out wind unless properly built. It is just as essential to keep out wind in a brooder or chicken house as to keep out rain. My house has a hip roof, and two years ago I put tarred paper on the north side and it kept out both wind and rain. My plan is: Put on good sheeting and cover with three-ply tarred roofing, and paint once or twice a year, and you will have the best roof in existence. With us the cost of 3-inch batten, per square is 75c., and good shingles $2.50 per square. Cost of putting on shingles are about $1 per square; total, $4.25. Three-ply tarred paper, per square, costs $1.50, good sheeting, $1.50. Putting on sheeting paper and painting, $1.00; total, $4.00 per square."

Charles A. French, Sandypoint, Me.: "Cedar shingles and sheathing paper."

Another correspondent: "Shingles over sheathing paper. No tearing off or tar running off in hot weather. Such a roof is about the cheapest in the end, as it requires no further, attention for a number of years."

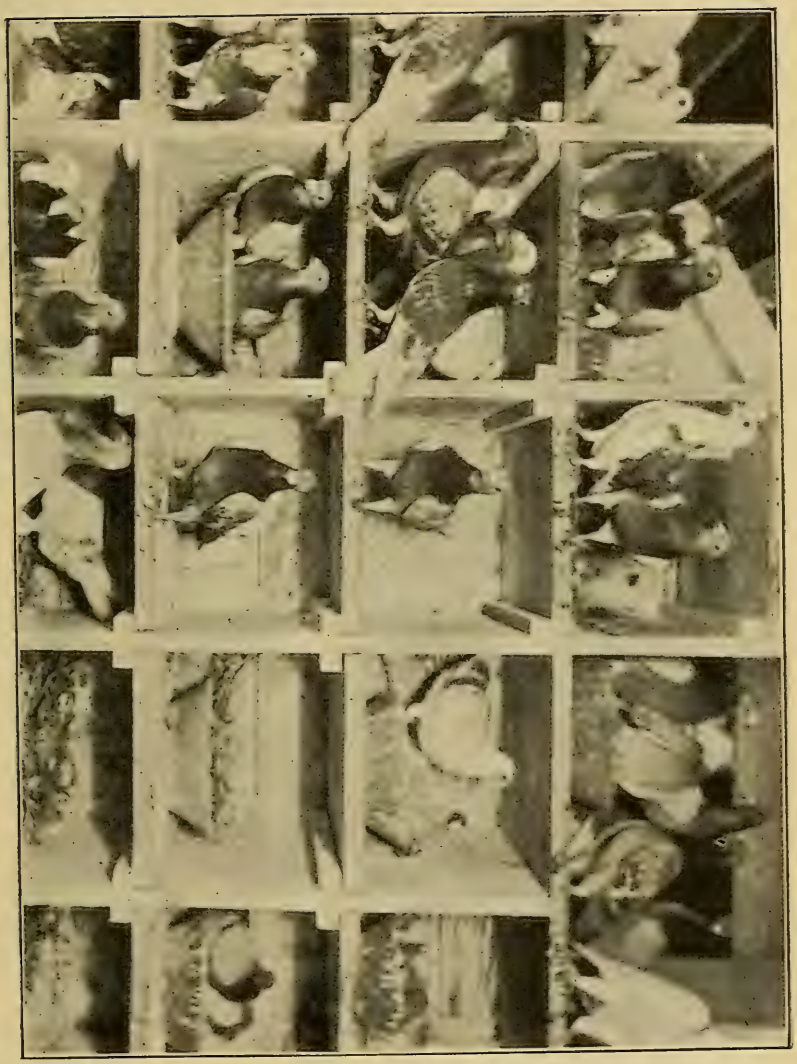

Plate 8.—HOMERS AT WORK.

A Canadian correspondent: "In my experience there is nothing that will beat the gravel roof for our climate (Canada.) If it is well put on at first, it will last longer and be warmer than any other roof. But it should always slant to the North, and no more than a half-inch fall to the front. I make mine three-eighths and find it about right. Of course it will be warmer in Summer, but I leave the doors and windows out, and that leaves it sufficiently cool at night, using wire screans to keep out vermin."

Emory E. Banks, Crittenden, N. Y.: "Prefer two thicknesses of hemlock boards, with lining paper between and batten or ship-lap lumber on the outside. Next preference is Neponset roofing with Neponset lining on under side, and kept painted or tarred."

William Barry, Park Ridge, N. J.: "I prefer a tin roof. I tried the Neponset, but a heavy hail storm cut it badly."

E. H. Williams, Coldwater, Mich.: "I use Neponset Red Rope and find it very satisfactory and cheap."

W. M. Shaw, Swissdale, Pa.: "The best roofing for poultry houses is composed, first, of either rough or dressed pine boards, beaded, or mortised, same as flooring boards, forced close together, and on top of this place one layer of No. 2 or 3 felt roofing, heavily tarred once every year or two. This is a roof for warmth in Winter and cool in Summer."

W. W. Kulp, Pottstown, Pa.: "I use mostly Neponset. It makes a good roof, and lasts about 20 years. Felt roofing I would use, but it costs too much trouble; always leaking. Tin is fine but costly."

C. E. White, Fox Chase, Pa.: "I use nothing but Swan's Standard Roofing, and find it very satisfactory. Before building my house I visited many prominent poultry farms in Massachusetts and New York state, to pick up whatever points I could that would be of value, and this was one of the most valuable ones. I saw at James Rankin's farm roofing of this kind that had been in use for 12 or 13 years."

By the Editor: We are using Paroid roofing, manufactured by F. W. Bird & Son, East Walpole, Mass., and find it strictly first-class.

Geo. H. Northrup, Raceville, N. Y.: "I find that a slate roof gives the best satisfaction of all. It costs more at the start, but when once put on will last as long as the building stands. I know of slate roofs which have been on as long as 50 years, and are as good now as when first laid."

Bowel troubles have been the cause of considerable loss among brooder chicks. The following symposium contains good advice on the subject:

William E. Anderson, Belvidere, N. J.: "I use the following prescription furnished me by Dr. P. T. Woods: Mix a little red oxide of iron (Venetian red) in drinking water for a few days."

P. F. Daniel, Atlanta, Ga.: "Locate the cause (for there is a cause) and avoid it. Feed a well balanced ration. My experience

is that the bowels will regulate themselves unless the chicks have been severely chilled."

Emory E. Banks, Crittenden, N. J.: "My remedy for diarrhoea in brooder chicks is to feed more hard boiled eggs, scalded milk, wheat, germ, etc., dropping animal meal and feeding less or no cornmeal, green food, etc., as the case may be. When costive I reverse the order. I have had more trouble with the latter than the former."

A. De R. Meares, Hyattsville, Md.: "Bran before the little chicks all the time."

J. W. McCarty, Windsor, Vt.: "Boiled milk and more dried food than generally fed."

W. J. Gordon, Pickering, Ont.: "Proper heat—not too hot nor too cold. Put horse chestnuts in the drinking water, and see that the water is kept cool and fresh. Feed dry rolled oats, dry bran, hard boiled eggs and plenty of grit and green food. Have a big run."

H. S. Thompson, Stratford, Conn.: "Have plenty of heat for the first week. Avoid crowding—and kill the cripples and weaklings that start the crowding. Tincture of asafoetida in the drinking water is good."

Matt. G. Robson, Port Leyden, N. Y.: "My wife gives the chicks a little black pepper in milk, but one must be careful that too much is not given, as it may injure the liver. Never had any trouble that way, as I watch the chicks closely and change feed if I notice anything wrong."

Irving C. Hutchins, Rochester, N. Y.: "Have had but little trouble with bowel difficulty in young brooder chicks. The best preventative that I know of is to keep fresh water before them all of the time, feed pin-head oat meal dry, furnish them with plenty of grit and a fair amount of green stuff, as well as to give them a chance to run."

B. A. Stoker, Sebastopal, Calif.: "Change the food. Give bran, coarse cornmeal. Watch very carefully the temperature of the brooder and room. My first feed is rolled oats for several days."

Harry C. Nunan, Cape Porpoise, Me.: "Boiled rice with me has always given good results. Feed sparingly."

William A. Penfield, Waterville, N. J.: "Keep dry and warm; feed dry food—Johnny cake, cracked wheat and corn, plenty of charcoal, grit and pure water at all times. But let them get hungry before feeding grains. This is also a preventative which is better than the cure."

In preparing broilers for market, great care must be taken in the work. Properly dressed carcasses are attractive and find a ready sale. A writer in Farm Journal says, in dressing, chicks will lose about 12 per cent or about nine pounds to the hundred-weight. For at least a week before slaughtering they should be fed on corn meal and milk almost exclusively. Other food should be given as a variety to keep up their appetite. Corn meal is the cheapest fat-

tening substance that can be supplied, and gives, also, a yellowish cast to the flesh which is very desirable. Where there are fowls or other chicks to interfere it is well to pen those to be fattened in a clean, shady yard.

As dry picked poultry commands the best prices it is advisable to dress broilers in this way if it can be done without inflicting unnecessary torture upon the birds. In opposition to many kind-hearted folks who have drawn harrowing pictures of hanging human beings up by the heels and pulling the hair out by the roots and have drawn other horrible comparisons, we maintain that killing and picking dry is no more cruel than killing and picking after scalding. Whether the bird suffers prolonged pain or not depends on the manner of killing and not on the manner of picking.

There is much to be learned about dressing poultry. It is useless to send fowls to market unless fat and neatly dressed. Attractiveness is an important feature in selling, and great loss frequently occurs from lack of it. In selling to local dealers use the same care in dressing that would be taken if shipping to a distant commission merchant is the advice of a writer in The American Agriculturist, who says: Fowls look best when dry picked, especially if fat and plump. If they are not in fine condition, it is best to scald them before picking. When dry picked, the natural firmness of the flesh remains, and poultry for general markets should be so prepared if possible. Let the fowls go without food for 12 or 24 hours before killing, so that nothing will remain in the crop to sour. Kill by severing the veins of the neck or inside the mouth. This can be quickly and painlessly done with a sharp knife. Hang the fowls by the feet to bleed and pick while the bodies are warm, using great care not to tear the skin. Leave the head and feet on and do not remove the crop or intestines. Wash in cold water, wipe dry and hang up by the feet in a cool place. For scalding, heat the water about to the boiling point. Holding the fowl by the head and feet, dip the body into the water three or four times. If the head touches the water, it will give the eyes a shrunken appearance. Buyers are naturally suspicious, and if the eyes are sunken they think the fowl has been sick. When the feathers and pinfeathers have been removed, immerse the fowl in scalding water for four or five seconds and then dip immediately into ice cold water to give it a plump appearance. If the head is cut off, turn the skin back of trifle, cut off the bone, and drawing the skin forward tie it neatly.

A writer in the American Poultry Journal gives this excellent description of the work of killing and dressing for market:

The chicks should be shut up the night before in a clean coop with board floor, sprinkled with sawdust or sand. They must be given a supper, but do not feed them a particle the day they are to be killed. All the arrangements for picking should be made the day before. A long, narrow coop should be arranged close to the sticking pole, and this pole should be placed near where the pin featherer is to sit. We nail a pole or shingle rib fast to the feed

room or end of brooder house. This pole projects out about four feet. Near the end we tie a piece of twine (doubled), and this comes down just low enough so that when we slip the chick's feet in the slipnoose in the end of the string the body of the chick will come down just below our shoulders.

The small blade of a pocket-knife (if sharp) answers well for sticking. The doomed chick is bound up by the feet in the slipnoose, and the killer should run the backs of the third and fourth fingers beneath the other wing. Shut down on the wings and with the right hand raise the head and place it between the thumb and third finger of the left hand; open the beak and prop it open with the first finger of the left hand. The head should be in such a position so that the beak will point out from the hand and so the roof of the mouth (when opened) will be presented full to the killer. Thus we hold the chick securely, and by holding tightly and pulling down on the string the bird cannot move, no matter how hard he may try. The right hand is left free to stick and pull the feathers. The killer now places the knife in the bird's mouth and shoves the point into the brain of the bird. This is the particular point in killing. This stab should be made in the center of the mouth, between the eyes and ears. If correctly done you will feel a slight shiver—so to speak—pass through the bird, and thus he loses control of the feathers so that they can be pulled out by the handful without tearing the skin. Remember, it all depends on this sticking, and a little practice will soon tell how it should be done. Draw the knife from side to center on each side at top or roof of mouth. These cuts should be made just back of the eyes, and if cut sufficiently the blood will run a stream out of the mouth. The mouth is then dropped, but the thumb and finger of the left hand should still hold a few feathers on top of head so the bird cannot spatter blood on the killer.

All this is done in much less time than it takes to tell it, and the feathers should be drawn immediately. By twisting the wrist of the left hand the breast of the bird is brought around to the front, and the feathers should be removed here first. If they come easy they can be drawn anyhow, but if hard then pull all feathers toward the tail or up, and only a few at a time. Give the wrist of the left hand another twist and bring the back around. Remove the tail feathers—by pulling up—and then work down the back to the neck. Now pull the feathers (carefully) from the butts of the wings and parts of the neck, then return to the fluff, after which let go with the left hand and grasp a wing. Pull the short feathers and then the quills. In this hasty pulling we have only drawn the large feathers and have very probably left a good many scattering ones, which can now be pulled more leisurely. About this time the bird will be going through its death struggles, and it can again be held as formerly, while the picking proceeds, and it is now ready to be passed to the pin featherers.

If done as it should be it will take from one to two minutes to dress him. The pin-featherer is supposed to carefully sew up all

torn places, if any. This method may seem cruel, but it is the only way to get the feathers off. After the bird has struggled the feathers cannot be drawn without taking the flesh with them. The market demands dry-picked chicks, so dry-picked they will have to be. A high stool can be used to partly sit on if desired. As the chick is relieved of its large feathers it is passed in the door to the pin-featherers. If the weather is hot, then things are moved to a shady corner. Thus the sticker has to take but three or four steps to either get a chick or pass one along to the women. A large barrel (oil barrels after the oil has been burned out are good) stands handy to the pickers (outdoors under a window and protected from the sun). This barrel is filled with fresh, clean water, to which a little salt has been added, and as the chick is dressed it is thrown in, and should remain there two or three hours. At noon these should be washed—the feet and mouth—and placed in another barrel of clean water, in which they may remain over night. If the weather is warm ice should be added to the water. If the chicks are to be shipped to a distant market next morning, and ice is to be used, then the chicks need not be dried, but if no ice is to be used chicks should be hung up to dry an hour before packing.

Pack in boxes that will hold not over 10 pounds each. Place in a layer of clean straw and then a layer of chickens. Fold the neck under one wing and press the shoulders well up against the straw at sides of box. The chick should rest on the breast bone, with the legs straight out. Place in a row all around the box, then another row around those, shoving the shoulders well up to the tail of the first row. If a small space should yet remain place in enough chicks to fill it up, but lay these on their sides on top of the legs of the other chicks. A thin layer of straw can now be used, or the second layer of chicks may be placed directly on top of the first layer, and so on. Pack as tightly as possible so there will be no moving. Fill up remaining space, if any, with straw and press on the cover. If ice is used keep the chicks in place by nailing in narrow pieces of board, cut so as to just fit inside the box, and place the ice (broken up rather fine) in these, and be sure and have enough to last until the chicks arrive in market. The narrow slats will keep the chicks from moving as the ice melts. If barrels are used then fine ice will have to be worked in between the layers of chicks.

The method as adopted by a Hammonton, N. J., poultryman, is as follows:

After the birds are caught and weighed, they are fastened by their legs to a stout cord suspended from the ceiling (a barrel being placed underneath them to catch the blood and feathers). The operator then gets the bird in front of him, and places it under his left arm. He inserts a knife back in the mouth, and then, bringing it a little forward, cuts crosswise, severing an artery. During the operation the mouth is held open with the fingers of the left hand. Great care must be taken not to cut too much for fear the bird will

die before the feathers are all removed, in which case it would be difficult to pick.

The feathers of the breast are first plucked, then those on the neck, followed by those on the back, the tail, and wing feathers, finally cleaning off those on the legs. The more expert one becomes the quicker this operation is performed.

After the long feathers are removed, pin-feathering begins, and generally before the carcass is cold the body is entirely bare.

The birds are then thrown into a tub of ice water, to which some salt has been added. When thoroughly chilled, the carcass is removed, the clotted blood in the mouth is taken out with the finger, and the bird again placed in cold water for a final cleaning.

The foundation of success in broiler raising lies in procuring good eggs. On this suject R. W. Davison, Glendola, N. J., some years ago wrote a very valuable article, which appeared in the Poultry Keeper. We make the following extracts:

"It is impossible for the best machine to hatch poor eggs and the best brooding arrangements cannot raise weakly chicks. The first of importance, then, is the hen that lays the egg. In order to get a strong, healthy egg we must have only strong, healthy hens in our breeding yards. The vitality of these hens must not be sapped by in-breeding. This fault may not show itself in the parents but will in the chicks. We must introduce new blood each year.

"There is great difficulty in procuring desirable new blood by purchasing new roosters, for these roosters may, themselves, be from in-breed stock, and to overcome this difficulty we should raise our own. This can be accomplished by having a pen of fowls properly mated for this result. It has often been said that the rooster is half the flock and there is more truth in the statement than most people think. There is nothing so reliable as a good, healthy, early hatched cockerel. February is the proper time to hatch the cockerels, and by keeping them growing you can then pick out the best of them, in the fall, and be sure of good results.

"I advocate early hatched pullets (not later than March hatch) for stock layers. It is probably true that not quite so many chicks can be raised from them as from hens. If, however, the hens are overfat, as is too often the case, then give me pullets. These pullets should be got to laying by October 1st, and then by November 1st the eggs can be used for hatching.

"Just a word here as to the care of these pullets. By the first of June, or right after mowing, they should be placed out in the fields away from the cockerels and the rest of the stock. Build small houses that will hold about fifty chicks until maturity. Have these with a hinged front—hinged from the top—so that when the weather grows warm these fronts can be raised and thus form a protection from the sun and storms. Leave these open during warm nights. These houses need be only large enough for roosting quarters and made so light that they can easily be moved to fresh

ground every day. Of course no floor is used therein. These houses will soon pay for themselves in fertilizing the ground. I usually allow them to remain two nights before moving, so as to give a heavier coating of droppings. The next crop from that field will always show just where the coops have stood. Always place the coops in a grass field, and if possible, next to a wheat stubble.

"It will be necessary to feed twice a day if we want rapid growth. The morning feed is a soft mess of a general mixture without meat. The night feed should be wheat, oats, barley or buckwheat, and in quantity about what they will eat up quickly. You will soon find that they will not require heavy feeding as they will gather nearly a crop full before night.

"The object should not be to force the comb (early laying) but growth. We cannot force both at the same time. After a pullet commences to lay her growth practically stops. I wish to lay great stress on growth, as it is the peg on which future success with broilers hang. We must have a large, strong, well developed frame. These flocks of fifty chicks should be placed far apart and on new ground, i. e., ground that has been tilled since last used for chicks. I know, from my own experience, that those who can give the method a trial will never go back in the old ruts. Chicks must have freedom if the best results are desired.

"Properly speaking, these pullets should be mated with two-year-old roosters and yet the hen herself throws the largest influence in the chick, and while the rooster is of great importance the hen is the "all and in-all" after all—please excuse the alls. The strongest two-year-old rooster cannot insure strong chicks if the pullets are immature or the hens are sickly. The trouble with hens is that they will be in molt about the time we wish to commence to set—November 1st—and they will lay but few eggs and the eggs will not be at the best. I hang my faith—all things considered—on early hatched pullets if managed as above. We may loose a few more chicks but we will also have more eggs.

"If the cockerels are hatched in February and kept growing, then we can use them, as they are more vigorous and far more certain than cocks. These are the first steps in broiler raising, and we should, yea must, be successful here before taking up the other. Where a large number of fowls are kept the only practical way is to yard them in flocks of fifteen. Give plenty of house and yard room. Keep them busy, and introduce a vigorous cock or cockerel in each yard. Keep your eye on the cock. Number each pen and as you gather the eggs at night, mark each egg with the number of the pen in which it is layed. All eggs from pen one should be marked one and so on. As you test these eggs, after they have been in the incubator five or seven days, note how they come out, not only as to fertility, but also as to strength of germ. If they fail to come up to a reasonable average remove the cock and try another, as the fault will usually be in him, but not always.

"Over fatness in the hens will produce unfertility, and then once in a while you will find a barren on sterile hen. We will often find a cock that will be all right the second year, and sometimes the third year too. Always use such, as they will insure stronger chicks, and by keeping your eye on the eggs at testing time, you can regulate these things to your liking. Always keep over a few of the best of all early hatched cockerels, so as to have something to fall back on in case of emergency."

CHAPTER VIII.

The Squab Industry as Gleaned from a Visit to William E. Rice, of Bridgeton, N. J.

Of late years the squab pigeon business has developed quite a boom; and, as seems customary in all booms, speculators have been making money out of it. The press throughout the country have published all sorts of "expert" articles, and these led to the belief that the "Royal Road to Wealth" was simply nothing more than a pigeon plant. Of course, all such writers had axes to grind. They were dealers in pigeons and supplies.

About the first reliable information given the public came from a manual (Farmers' Bulletin, No. 177) issued by the United States Department of Agriculture, entitled "Squab Raising," by William E. Rice.

In order to get as complete data as possible, the writer paid Mr. Rice a visit at his home and lofts—83 Fayette street, Bridgeton, New Jersey—with gratifying results.

Plate 7 is an excellent portrait of Mr. Rice.

Plate 8 gives full view of working Homers, showing nesting pans, and squabs in nests. The birds represented in this picture number fifty pairs, and are eighteen months old. They are bred from the finest stock money could buy.

The floor of each nest is movable, so it can readily be taken out and cleaned. Mr. Rice once a week dashes a mixture of lime and carbolic acid in these nest boxes, and claims it to be the best preventive of lice and disease.

"I will give a dollar a piece for every louse found on my birds," said Mr. Rice, "with the exception of wing lice—long, thin insects that are always more or less common in lofts, but which do no harm."

The louse that causes the most trouble is a small, round fellow, and found on the head and body of the bird. These blood suckers, if allowed to increase in numbers, will soon sap the life out of the flock—first attacking the weakest of the lot.

If lice get a foothold they will increase with remarkable rapidity, and it will mean hard work to get rid of them. Plenty of kerosene oil must be used. The nest boxes, perches, and every crack, crevice and corner must be fairly saturated with it. This must be followed up with a weekly cleaning, and powdered lime well saturated with crude carbolic acid scattered in the corners of the nests.

Mr. Rice is opposed to the use of sawdust for the bottom of nests and on the floor. He says the worst attack of lice he ever had

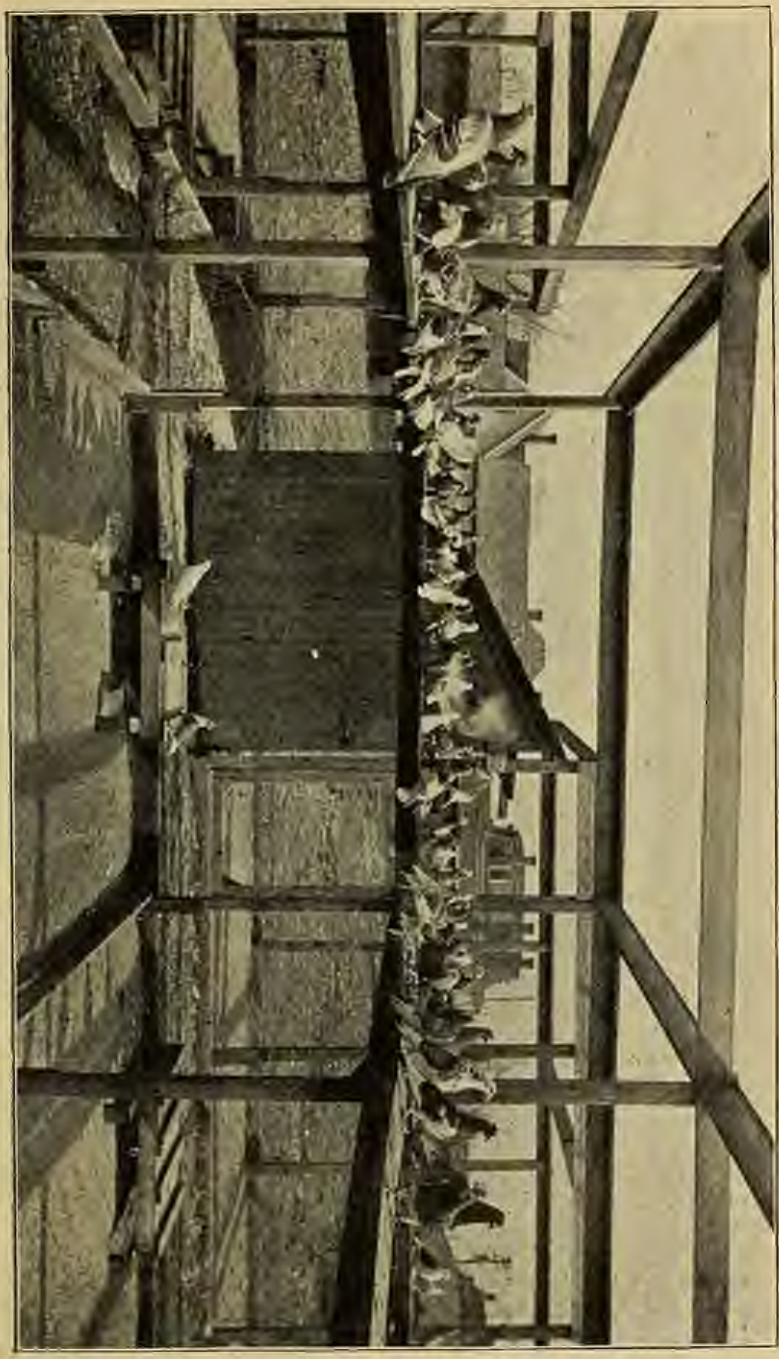

Plate 9.—THE OUTSIDE FLY OR AVIARY.

was when he used sawdust, and since discontinuing its use he has had no further trouble.

Cleanliness is an important factor, and this rule Mr. Rice strictly enforces. His pens are kept very neat and thoroughly disinfected. The birds are given a bath during the Summer, two or three times a week; in Winter, once a week, about the middle of a nice bright day.

Mr. Rice supplies his birds with tobacco stems for nesting material.

All new stock should be quarantined before placed with the breeding flock. A good dusting with Persian insect powder, or snuff, will clean them of vermin.

Plate 9 shows birds just described, and also gives view of length and width of fly.

In the rear of the fly will be noticed a small house. In this Mr. Rice is experimenting with twenty-five pair of first-class birds, every pair of which are straight Homers, with the exception of one bird—a White Dragoon. This experiment is conducted to ascertain what can be accomplished in small quarters during cold and warm weather.

The birds were placed in this house on the first day of January, 1904, and up to the date of our visit—July 21, 1904—they produced an average of six pair of squabs for each pair. At this rate Mr. Rice thinks it safe to say that by the end of the year each pair of breeders will have ten pair of young to their credit.

The house is only 6x8 feet (floor space), and is four feet high in the rear, and eight feet high in front—slant roof. The fly is six feet wide, eighteen feet long, and eight feet high.

There has been no sign of sickness in the flock so far, and only two squabs were lost, caused by a fight between two cock birds, they trampling the young to death in the nest.

Mr. Rice, however, is not an advocate of small houses, especially for beginners, who are too apt to neglect birds causing trouble from which they would not know how to extricate themselves.

Plate 10 shows a model house of five pens, containing two hundred and fifty pairs of birds. , The house measures forty feet in length, twelve feet in breadth, and more fully described later on. The aviary or "fly" is thirty-two feet long, and eight feet high.

The bath tubs are seen to the left of the picture. These are zinc lined, and when not in use are turned upsidedown, as shown in the illustration. As soon as the birds are done bathing, the tubs are emptied. The water is of an oily nature, and looks very much like milk.

The ground-floor of each fly is covered with four inches of fine, clear grit sand. It requires four wagon loads in each compartment (which costs Mr. Rice one dollar a load). Four times a year these flies are scraped clean, swept and resanded.

Plate 11 shows inside of a fly containing a pen of two hundred young Homers, four months old, and selected for future breeding. The portrait shows well the clean, sanded ground space. Mr. Rice

thinks it just as essential to have this part as clean as the house. As rains make the ground filthy, this sanding prevents any stagnation and the birds remain more healthy.

Plate 12 is an interesting picture. It finds Clayton Tutis, Mr. Rice's "right-hand man," and who is more familiarly known as "Pink"—busily engaged at dressing squabs for market. "Pink" averages from 18 to 24 birds an hour, rough picking; or 14 to 16 complete picking, which includes the removal of all the pin feathers.

On picking days, before the stock is fed and watered, the squabs intended for market are caught, placed in a hamper, and removed to the killing room. As soon as this is done the rest of the stock is fed and watered.

These hampers are placed within easy reach of the pickers, and beside the picker is kept a basin of water. Directly in front is suspended, in a horizontal position, a ring of wood or iron, about a foot in diameter, and from this ring hang four cords, eight inches long, sufficient for hanging four squabs at one time. A slip noose is made around the legs, tail and wings, allowing about two inches of the ends of the wings to project beyond the noose; tightened well.

With a sharp, pointed knife a straight cut is made well back in the roof of the mouth, and then it is drawn forward, cutting clear into the brain. This being done a piece of wire, about six inches long, and weighted at the end with a piece of lead about a quarter pound in weight, is hooked in the squab's mouth.

Four birds are killed in turn, and picking is immediately begun when the first one is dead. But until experience and speed are acquired, Mr. Rice thinks novices had better kill and pick but one bird at a time. They must be "rough-picked" before they get too cold.

After killing, allow the birds to remain suspended, but release the wings, grasping them both in the left hand, back of the bird, while picking. Dip the thumb and forefingers of the right hand in the basin of water, and begin picking the neck, allowing three-quarters of an inch of feathers next the head unpicked. Continue to hold the wings in the left hand until the entire front of bird including legs, are free of feathers. While removing the remaining feathers from the bird, bring the wings in front of the bird, holding them in the left hand as before, and while thus held also pluck the quills and larger feathers from the wings, after which finish each wing separately.

The rough-feathering being completed, the pin-feathering is performed, a small knife being helpful in this operation.

When a man becomes expert in this work, he does not finish up the feathering of the four birds before he kills a new lot, but as soon as three are finished he kills three more, and while they are bleeding he cleans the fourth one.

As soon as a squab is completely dressed it is thrown in a tub of cold water to drive out the animal heat, and to firm and plump it. After all the birds are picked, they are placed in another large tub of water (Mr. Rice uses cold spring water for this purpose), and finally the feet and mouths are carefully washed to remove all filth

and blood. They are then placed in the third tub where they remain until ready for shipment, one or two hours, as required.

During the Winter the birds, after dressed and washed, are hung on hooks. Plate 13 shows one hundred and six squabs hung up to dry, ready to pack and ship.

If the birds are sold to a local dealer, they are taken from this rack, placed in a basket and delivered immediately. But when they are to be shipped they are packed in a box or barrel between layers of ice. The amount of ice needed depends upon the time of the year the shipment is made. During Winter no ice is used.

On the day of our visit "Pink" was busy at work getting ready for a shipment of squabs. There were one hundred and eight birds in the lot, averaging eight pounds to the dozen. The prices last year averaged sixty cents a pair, but this year (1904) the prices run a shade better.

It was interesting to watch the packing. Mr. Rice did that himself. A shoe box was used for the purpose, and the inside was neatly lined with manilla wrapping paper. About two inches of crushed ice was placed in the bottom of the box, and then came the packing of the squabs. They were placed in a slanting position—heads down and feet up—the latter slanting about an inch above the head. In this way the one hundred and eight birds were placed and ice liberally used, several inches of it being on top. Then came more paper, and then the lid was tacked on, and the top wired to prevent tampering.

We could not help admiring the plump carcasses—plump and fat, and with breasts as round and full of meat as it is possible to get them. Homers certainly do produce fine carcasses, and their clean white appearance is an attraction.

Mr. Rice has been experimenting with a cross of Dragoon on Homer, but it is not so satisfactory as the pure Homer. The Dragoon gives the carcass a prominent breast bone which spoils its looks.

"The novice should begin with from fifteen to twenty-five pair," he said, "but before he buys he wants to know something of the goods he is about getting, and the methods of the man he buys from. Birds should be banded, and a record accompany them, telling the color and sex. This is a guarantee, and he will be safe in putting them in the coop. If he buys haphazard, trusting to the verbal assurance of the seller, he is apt to make a mistake, and not have success. He must know what he is going to do before he starts.

"A mistake beginners so often make is that they put new birds in their flock. This too frequently breaks up the original flock, and there is great loss.

"So many big advertisers do not know what the birds are which they are selling, from the fact that they buy them up all over the country. They have no way of finding out. The result is the buyer gets them home, believes he has mated stock—sooner or later he quits the business, and all because he did not buy right in the first place.

"If not run on a scientific basis, no success can be made of the squab business. It must be made a study, and the beginning must be with mated birds. If mated they will go right to work, provided, of course, they are supplied with good, clean water, good feed, plenty of charcoal, grit, oyster shell, and fine table salt.

"I think the Spring of the year is the best time to start.

"What the beginner generally does if he wants to increase his flock, is to buy ten pair of breeders and save all the birds raised the first year. He will have, as a result, fifty to sixty pair of young birds. He will let them all breed. The following year they will begin raising squabs, and probably one hundred pair of young will again be saved for breeders. The third year comes trouble—the squabs begin to die at the age of two or three weeks, while others will be weak and puny.

"Then the beginner rushes to a pigeon dealer and wants to know what ails his squabs. They hatch all right, but die at a tender age. No one seems to know what is the matter. He continues the same breeding and reaps the same results. The trouble lies in the inbreeding from that original flock of ten pair. Sisters, cousins and aunts are all bred together. The offspring have no stamina, and the parent birds do not properly feed and care for their young.

"That is the cause of most of the failures."

It was very plain, on our visit to Mr. Rice, that if a beginner will visit a good, practical man he will learn more in two hours talk than he can experience in two years labor.

Whenever Mr. Rice changes a house and flock, he has the interior of the pen heavily whitewashed. One cannot do the work too well.

Mr. Rice prefers the Homer for the squab business. Some think a Runt crossed on Homer gives good results, but Mr. Rice has experienced that this cross seems to wipe out the nature of the Homer blood. The best cross he knows of is Dragoon on Homer, but nothing equals the Homer blood straight. He has also found that the Dragoon is not as hardy a bird as the Homer.

Mr. Rice was asked what he considered the breeding life of a pigeon, and he replied that he has bred continuously from one pen for six years, and still finds them good for that purpose; but after seven or eight years breeding, they are of little value. Their prime of breeding life he considers between the age of three and five years.

He said the first year the parent stock are apt to be more or less neglectful, for want of experience. "They are very much like a young married couple with their 'initial boy.'"

Then came the subject of feed and feeding, probably the most important part of all the work, and upon this subject the writer secured considerable valuable advice, which we condense as follows:

In buying grain, be careful what you buy. The best is none too good, and great care should be taken in its selection.

The staple articles are cracked corn, wheat, Kaffir corn and Canada peas. Millet and hemp are given occasionally.

Never feed the birds in the fly, but always inside of the building.

Always feed from a trough.

Don't give more than they will eat up clean.

Feed twice a day. In Summer, about 6.30 a. m., and 4.30 p. m Winter, 7.30 a. m., and 3 p. m.

As soon as the pigeons are given their food, close up the houses and do not stand about or among the birds at feeding time, or they may neglect the squabs and will not properly feed them.

Do not tamper with the birds for an hour after being fed.

One box, about the size of a small cigar box, should be filled about a third full of fine table salt; another with cracked oyster shell; and another with pulverized charcoal. Once a week replenish the supply of each, as all three articles are invaluable in maintaining good health.

Each pen should be supplied with a feed trough about ten inches wide, and four feet long—the sides being one and a half inches high. This trough is placed in the centre of the room.

Mr. Rice averages two scoopfuls of a mixture of cracked corn, wheat and peas as a morning allowance for fifty pairs of birds..

The evening feed is a mixture of cracked corn, Kafir corn, millet and peas, equal parts.

Twice a week—usually Thursdays and Sundays—hemp seed is given in place of millet. Hemp and millet seeds must not be fed too liberally, as they are of a very fattening nature.

Always sift the cracked corn before feeding it.

Squabs are fed by the parent birds. For about the first five days of their life, nature provides a food commonly termed "pigeon milk"—a creamy substance contained in the crops of the pigeons, and which the parent bird ejects from its mouth into the mouths of the young. After that the parent carries grain to the young, and administers in the same way.

Mr. Rice says that at the present prices of grain, he has found that it costs him about one-seventh of a cent a day for each bird, or about fifty-two cents a year. His profits, with this feeding, have been an average of one dollar and a half per pair, net.

Fresh, pure, clean drinking water should be given daily in two-gallon stone fountains (in Winter galvanized fountains are used, instead of the stone ones, as the latter are apt to crack from the water freezing). These fountains should be washed carefully each morning before filled with fresh water. About twice a week place a piece of stone lime, about the size of a hickory nut, in each fountain. About three times a month disinfect the fountains by using ten drops of carbolic acid in each two-gallon fountain. Mr. Rice says it does no harm to allow the acid to remain in the water for the birds to drink that day.

Mr. Rice's plan for a house for a novice, is as follows:

Face the South, if possible.

Build to either of these sizes: 6x8 feet, 8x10 feet, or 10x12 feet, to accommodate from ten to twenty-five pairs.

Have the back of the building four feet high; the front six feet.

Have a nine-light window in front, eighteen inches from the floor. The window is to be taken out in Summer.

Place the door on the west side.

The fly can be made from sixteen to twenty-four feet in length, eight feet high.

For a larger house, Mr. Rice recommends: Forty feet in length, twelve feet in width, and six feet the height for both front and back walls; peak, ten feet; gable end, nine feet; floor space of each pen, 8x9 feet. This building can be divided into five pens, in which fifty pair of breeders can be placed in a pen, or two hundred and fifty pairs in the entire building. Each pen is also supplied with one hundred and twenty nests.

CHAPTER IX.

Pointers on Duck Culture, and Experiences by the Most Extensive Duck Raisers in This Country.

Provide shade. Too much exposure to the hot sun is fatal to young ducklings.

Do not feed whole grain.

The duck usually lays at night.

Never let the supply of drinking water run out.

Ducks require soft, succulent food.

The foundation of success lies in the breeding stock.

Vigorous stock can be profitably bred at four years of age.

Fifty per cent is a good average hatch early in the season.

The bulk of failures is due to use of weak breeding stock.

From July to September prices for green ducks remain unchanged. From September to November ducklings again bring good prices.

Green ducks at eight weeks old should weigh nine pounds to the pair.

Do not allow the ducklings to get wet before they assume their white feathers.

Whole grain is apt to produce leg weakness, and the birds break down and die.

Do not forget that a duck cannot well eat without having water to drink with it.

At ten weeks of age, ducklings should weigh from 10 to 11 pounds to the pair.

Green ducks bring the best prices about May 1st. From then on until July the price gradually falls.

George Pollard, of Pawtucket, R. I., prefers ducks and drakes in their second year for breeding.

Clean sand should always be mixed in the food of old or young ducks. About a handful to a half bucket of feed.

George Pollard feeds his ducklings, the first four days, two-thirds bran, and one-third cornmeal, mixed with cold water or skim-milk.

A good mating is a drake to four or five ducks in the early part of the season, and six to seven ducks to a drake during the summer.

Always keep a trough of cracked oyster shells before the breeding ducks.

In dressing ducks, dipping the hand or fingers into a dish of water, causes the feathers to stick to the hand, and enables one to remove them more rapidly and with much less exertion.

The last of August generally ends the duck laying season.

An average picker will dress from 40 to 50 ducks a day.

C. F. Newman says duck eggs for hatching should not be washed, or the oily, greasy covering on the outside shell will be removed, and they will not hatch so well.

After the first four days, George Pollard gives his ducklings a mixture of equal parts of cornmeal and bran, and seven or eight per cent of beef scraps. After this the per cent of beef scraps is gradually increased. This mixture is fed up until killing time.

Prof. Samuel Cushman says in Rural New Yorker, that leaving the bran out of the duck feed stops their eating. It might work with green food, but does not without. Feeding green food makes the ducks yellow, and they sell for less. White-skinned ducks are demanded.

An earth floor in the breeding house is best.

Avoid overcrowding ducks as you would hens.

The first eggs of the season are rarely fertile.

Salt hay, leaves or chopped straw make good bedding.

Charcoal in the food of the young will prevent sickness.

It is a mistake to allow young ducklings an unlimited range.

Medium-sized drakes are considered the best for market production.

Ducks kept on land must have fresh drinking water at least three times a day.

A less number of drakes are needed in a flock where bathing water is supplied.

Half-grown ducks, when overcrowded in a pen, are apt to get into the vice of pulling feathers.

James Rankin sows rye or barley every summer in the unused duck yards in order to purify them.

Do not feed green food the week before killing for market, as it gives the flesh a too yellow appearance.

Mr. Rankin estimates that a young duck can be grown to ten weeks of age at a cost for food of four cents per pound.

It is hard to fatten the laying duck.

All the market ducks are scalded before dressing.

Clover hay steeped in hot water, is a good substitute for green food for breeding stock.

A brooder 7x10 feet is about right for 100 ducklings.

Ducklings usually start their molt when about eleven weeks old. It takes a duck about six weeks to molt and get in good condition again.

A. J. Hallock places cracked oyster shell before his ducklings from the time they are put in the brooder house.

Twisted wings in ducks is caused by rapid growth of quills, they growing faster than the feathers holding up the flights.

Duck eggs must be set as fresh as possible to secure strong fertility and a good hatch. They lose their fertility very quickly.

Young ducks accustomed to bathing water at five or six weeks of age, will stand more of a rain storm than those kept on land.

Hallock's cold brooder is 175 feet long, by twelve feet wide. It is divided into pens 10x10 feet, with a limit of one hundred young in a flock.

Mr. Hallock says it costs five cents per pound to feed ducks up to ten weeks of age, two cents for help, two cents to market, and three cents for eggs, insurance, etc., making a total of twelve cents a pound. All over that amount is a clear gain.

Mr. Hallock keeps his ducks in the heated brooder for from three to five weeks, according to season and demand for room. After that they are put in cold brooders for about two weeks. Very early in the season they are kept in the cold brooders until ready for market.

Fifty breeding ducks should keep three 200-egg incubators going, and turn out between two and three thousand ducks in a season, giving one man all the employment he could want. When one man would have to do all the work, fifty ducks would give better returns than one hundred would.

Mr. Hallock places the feed for his young brooder ducks on regular feed sacks, instead of troughs. After the meal is over the sacks are gathered up, and when very dirty are washed.

Mr. Hallock says he would rather wash the eggs before putting them in the incubator, than to use very dirty ones. Yet he believes that washing does more or less injure them. He tried the experiment of putting eggs in one tray of his machine that were gathered from the bottom of the creek where the breeding ducks bathe in. He noticed that but 20 to 25 per cent of these eggs were fertile, owing to the length of time they were deposited in the water. At the same time eggs that were layed in the houses, or on land, gave 35 per cent fertility.

The weakest part of a duck is its legs.

Bathing water is an injury to a soft, green duck, as it developes too much muscle, and is apt to render the carcass tough.

From February to May the eggs are the strongest in fertility.

On the duck farm of Weber Bros., Wrentham, Mass., the young ducks for the first four weeks are fed five times a day. After that they are fed every six hours.

Bread or cracker crumbs, moistened with boiled milk, into which a little powdered chalk has been dusted, Rankin recommends as the proper diet for ducklings having diarrhoea.

In feeding ducklings, go through the pens several times, and give an additional amount to all that do not seem satisfied. One hour after feeding make the rounds, and gather up all feed that is left over.

Two weeks time will be sufficient for fattening ducks.

William H. Truslow says that the feathers from ten ducks are required to make one pound.

The saleable market duck must be fat, plump, and round, and the skin of a uniform color.

A good fattening food is equal parts of bran, cornmeal and middlings, and one-eighth beef scraps.

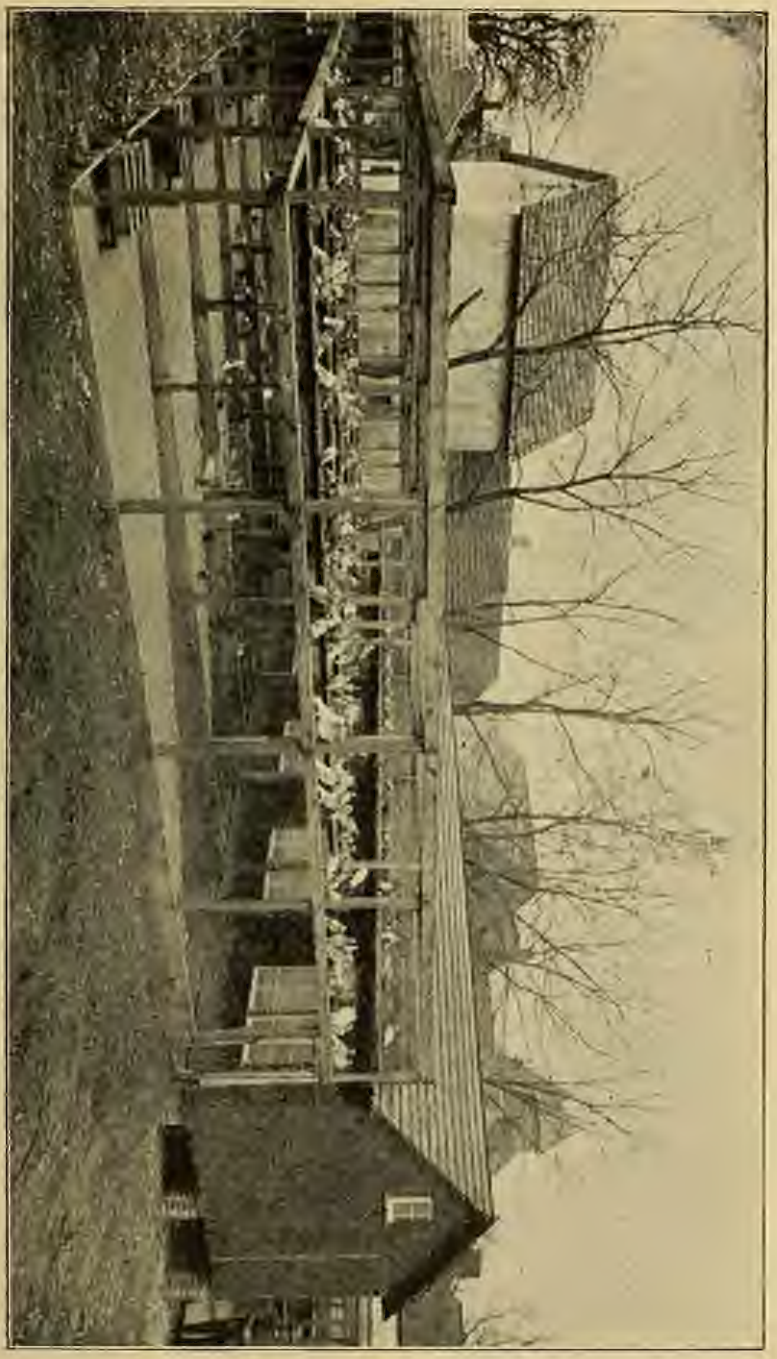

Plate 10.—A MODEL HOUSE OF FIVE PENS.

Ducklings should be started in the brooder at a temperature of about 100 degrees, and gradually reduced in about four days to 80 degrees. Sixty degrees will be warm enough at two weeks of age.

"Ducks love to be out in the rain storm," writes W. R. Curtiss & Co., "and we think there is nothing that will help increase egg production like a good, heavy rain storm, in which they can play and puddle to their heart's content."

Weber Bros. teach their ducklings to eat by dipping their bills in a pail of water, and then place them on a feed board covered with bread crumbs. When the beak touches the board, some of the dry food sticks to it, is tasted, and immediately they search for more.

According to Prof. Cushman, in Country Gentleman, Weber Bros. give these reasons for their success: Do not breed in-and-in, or raise breeding stock from anything younger than yearlings. Do not fail to give your young birds, to be used for breeders, more growing food, and more freedom, than you give the ducks that are fatted and killed. Mate up before November 1, and be sure to feed plenty of cooked vegetables and green food, as well as the right grain, if you want the eggs to be fertilized early in winter.

The following weights of ducklings from the shell to market, were gathered by A. J. Hallock, of the Atlantic Farm, Speonk, Long Island. Mr. Hallock has a camera and made the photos himself, which he showed to the writer while on a visit to his farm:

Half out of the shell, weight $2\frac{3}{4}$ ounces.
All out the shell, weight $2\frac{1}{4}$ ounces.
One week old, weight 3 ounces.
Two weeks old, weight $5\frac{1}{2}$ ounces.
Three weeks old, weight $7\frac{1}{2}$ ounces.
Four weeks old, 1 pound, 3 ounces.
Five weeks old, 2 pounds, 6 ounces.
Six weeks old, 3 pounds 12 ounces.
Seven weeks old, 4 pounds, 12 ounces.
Eight weeks old, 6 pounds, 2 ounces.
Nine weeks old, 7 pounds, 4 ounces.
Ten weeks old, 8 pounds.
Eleven weeks old, 9 pounds, 3 ounces.
Do not excite the laying ducks.
The laying of the young duck is irregular at first.
The duck feed should be neither too dry nor too sloppy.

Shake up the bedding every day or two, and remove the manure.

During cold weather it is better to house the breeding ducks than to allow them out doors.

During snowy or icy weather, throw bedding in part of the run so as to prevent the duck from getting cold feet.

Rankin runs his temperature in incubator for duck eggs, at 102 degrees the first three weeks; 103 degrees the fourth week, and 104 degrees when the ducks are about to hatch.

After repeated experiments the writer finds that a duck will consume on an average, eight ounces of mash in the morning, and

twelve ounces at night. The experiments were made with breeding ducks.

James Rankin says too often the health of the young bird is injured by the improper feeding of the mother bird during the laying season.

Mrs. J. R. B., Indiana, writes that she finds that medium sized eggs, shells entirely free from any lime sticking on outside, gives best results in hatching.

To illustrate how heavy a loss one could endure without failure, says John Weber, if one-half of the eggs put in the incubator only hatched and only one-half of those hatched lived, there would still be enough in it to encourage one to stick to the business without taking into account the fertilizing value of the vanquished host.

Weber Bros. give hard-boiled egg and bread crumbs as the first meal to their young ducks. When they have learned to eat they are fed on bread crumbs and rolled oats the next four days. After that they get the regular food of cornmeal, shorts, flour and beef scraps. They are fed five times a day until four weeks old, then four times.

John Weber, in an address before the Ploughman Farmers' Meeting, Boston, said if one already owns a farm, $1,000 capital would give a good start in the business. Such an amount would be sufficient to cover all expenses. Two incubators, a flock of about thirty ducks, a house for the breeders, a brooding house and heater, feed boards and water fountains, wire fencing, etc. Such a plant would keep one man busy, and the future growth of his plant could be built on the profits.

The Weber Bros. feed the laying ducks during the breeding season, equal parts of cornmeal, wheat bran, ground oats and flour. Ten per cent of beef scraps is added, and thirty per cent of boiled turnips and cut clover. They are given all they can eat night and morning. At noon they are given about a quart of whole corn to a pen. They seem to be very fond of this grain and begin calling for it with all their might long before noon. It is scattered up and down each yard, and the ducks scramble for it with their usual grace. A Pekin duck in a hurry is a comical sight.

At seven weeks of age, the ducklings should be fattened for market and fed only three times a day. Weber Bros. feed 3-4 meal, 1-4 flour 15 per cent beef scraps, and all the green food they can eat once a day.

James Rankin, in Farm-Poultry, says he never cooks the food for ducks after they are a week old, but mixes it up with cold water.

Weber Bros. bed with saw dust in summer and fall; meadow hay in winter.

Extra large eggs, ill-shaped and porous shelled ones, do not as a rule hatch.

Weber believes in having the best for breeding, it being folly to breed small, undersized birds.

Sand or gravel land, with a slope sufficient to give good drainage, is best for duck culture.

Weber Bros. allow about eight square feet for each bird, say 40 ducks to a pen 24x15 feet.

Contrary to all former notions in regard to duck raising, these thousands and tens of thousands of Pekin ducks that are annually marketed in New York, Philadelphia and Boston, from New Jersey to the coast of Maine, never saw water only in drinking troughs. They grow much faster when kept out of the water, and if fed properly will average at ten weeks of age, ten pounds per pair.

In hatching duck eggs in an incubator, keep the ventilator slides open at least for the first week.

A pig is modest and shy at his trough compared with a young duck, writes S. I. Hudgens, of Massachusetts.

Never suddenly change the laying ducks' bill of fare.

Second grade flour is used in the mash to make it more lumpy.

A duck is not fully matured until about two and a half years old.

Henry Steinmesch says the regular laying season commences about January 20, and a fair average is four eggs per week, per duck, from that time on to June 20, after which they gradually let down, stopping entirely towards the last of July.

There is more labor attached to duck raising than to any other branch of poultry culture, but the profits are better when the business is once understood.

Besides a trough of oyster shells constantly before the ducks, they should be supplied with coarse sand or chick-sized grit mixed in their mash, once a day.

The heavy coat of feathers, makes the duck rain, wind and cold proof, to a considerable extent, but they suffer very easily from cold feet.

A heavy soil is readily poluted, and should be cleaned and ploughed at least once a month.

Duck eggs over a week old do not hatch so well.

The older the duck the less nervous she becomes.

Artificial incubation developed the duck industry.

Contagious diseases are practically unknown in the duck family.

Cause of mortality among young: Overheat, dampness, getting wet, lack of grit, grey head lice, sudden showers, delayed hatches, exposure to sun, lack of fresh water, drinking vessels too shallow, breeding stock out of condition.

When ducks are overfat they are apt to die during laying season.

A deep keel gives a more plump appearance to the market duck.

Walter P. Laird says washing the eggs has a tendency to harden the shell and thereby superinduce too much evaporation, thus injuring the vitality of the egg.

Cayenne and other hot, spicy condiments, must not be given to ducks. Cayenne causes ducks to abort their eggs, and if its use

is persisted in it will cause inflammation of the egg producing organs.

Duck eggs generally pip 36 to 48 hours before hatching.

Walking past a flock of ducks with an umbrella hoisted will cause a panic.

The morning feed for grown ducks should be one-half the quantity fed at night.

F. E. Hege says the best matings are one-year-old ducks to two-year-old drakes.

In driving ducks go about it slowly. Excitement makes them weak in the legs.

Neglect will cause a foul stench to the yards, and produce sickness among the ducks.

As soon as a duck yard is empty, sow rye or oats in it. There is no better disinfectant for the poluted soil.

Walter P. Laird says that in duck eggs there is ordinarily enough moisture to hatch them, but in case the membrane of shell becomes tough, and the duckling has difficulty in freeing itself from the shell, the moisture pan nearest the lamp should be partly filled with water at 110 degrees.

A recent issue of the Ploughman says: "Duck raising will pay well for the right person, but it will not pay conducted in the careless way in which hens are managed on the average farm. Hens will lay some eggs if left to shift for themselves, but ducks will not pay a cent unless the owner understands his business and attends to it. They are enormous eaters and quickly consume the profits, besides being a deal of a nuisance unless grown, managed and sold just right."

F. E. Hege, poultry manager of the North Carolina Agricultural Experiment Station, says: "Ducks have always been reared in or near ponds in our state, and the general supposition is that water in large quantities is an indispensible adjunct, while the fact is that a pond of running water for the old ducks is all that is wanted, and even that is not necessary. It is detrimental to the young, and they should not be allowed to have more than a plentiful supply of cool, fresh drinking water, and even that arranged in such a way that they can only get in their bills."

Walter P. Laird, in Practical Poultryman, gives this method of dressing ducks for market: "Market stock when ready are killed by sticking through the roof of the mouth with the blade of a sharp knife, penetrating the brain, well bled and immediately dry-picked. After this is thoroughly done they are placed in tubs of clean water for a few hours. Before packing, ice is placed in the tubs to plump the birds and to free them from all animal heat. After this is done they are weighed, tagged and carefully packed in ordinary sugar barrels, which make a neat package. Six inches of space is left at the top of each barrel which is filled in with ice; the barrel is then nicely covered with a piece of cotton cloth, marked to our dealers, and they are ready for the express company. The birds are never drawn, and the feet and head are left on."

Rankin says it pays better to raise ducks than onions.

Newman claims that the Pekin duck is the largest, matures the quickest, has the finest plumage, lays the most eggs, and dresses the easiest for market.

Never approach a pen of ducks at night with a lantern.

Two year old drakes to young ducks make a good mating.

Handle ducks by the neck, never by legs or wings.

Newman prefers an 8-pound duck and an 8½ pound drake for breeding.

When ducks begin laying they generally show a black streak on the beak.

Breeding ducks should be selected at five weeks of age and not fattened.

The most notable growth is between the third and fourth week, when the duckling often doubles its weight.

A duck must have water about its eyes daily, or it will not thrive, says H. B. Geer. But if a tank of sufficient depth is provided for the ducks to sink their heads in the water clear out of sight, then they can do without the pond or stream. When this is not done they gum up about the eyes, become listless, sit about, don't eat, and soon die. Young ducks that do not have water as above suggested, drop off one by one.

Forty dressed ducklings are packed in a barrel for shipment.

The duck averages about 10 dozen eggs in about seven months' laying.

According to Rural New-Yorker, for the first four days A. A. Skinner, Greene, N. Y., feeds his ducklings four parts of bread to one egg, and one-third rolled oats. At the end of four days, about five per cent sand is added to the food; and each day following, until the end of the first week, the food is gradually changed by substituting bran and meal for egg and bread. The sand is given that there may be grit in the gizzard before commencing to feed bran, which has a course fiber, requiring grit to cut it. After a week he gives two parts of wheat bran, one of corn meal, 10 per cent beef scrap, and, of course, the five per cent sand should be continued until the ducks are fattened. Salt is used for flavoring at all times. About the time the sand is first given, he begins feeding green food. It is important that, at least, one-third of their food should be green stuff. It must be as tender and succulent as possible on the start, like clover, green rye or tender grass, cut fine. In winter, cabbage, turnips, beets, potatoes or any vegetables, chopped into small pieces with a root cutter, or even nice clover hay, cut and cooked will do. This green stuff is mixed with the other food in a large box, and moistened with water, but not made sloppy.

The Reliable Poultry Journal says, contrary to general opinion, duck eggs do not hatch as well as chicken eggs, not by 20 or 30 per cent. They are not as fertile, nor are they as strongly fertilized. Many duck eggs that are imperfectly fertilized cannot stand incubation, the embryo dying during the process of development. On the other hand ducklings are far easier to raise than

chickens, at least this has been the rule thus far, hence the duck men, given a good market, have always been able to make more money than the broiler man. There are ten successful duck plants in operation to-day for every one successful broiler plant, but we are confident this will not be so three to five years hence. The harder a thing is to do, the better the price, and the fact that ducks are easy to raise, are of rapid growth, etc., now threatens to overdo the duck business.

A correspondent in Country Gentleman, writing about the care of ducklings, says: "Your brooder must be prepared to receive the little beauties, and must have been running at 90 degrees for at least a day. Handle them carefully when removing, taking pains not to injure their legs or feet, as these are very tender. Keep them dark and quiet for at least half a day in the brooder, and then coax them to eat. Ducklings are very timid, much more so than chicks, and will not bear handling."

John B. Garber, in Rural World, says he feeds little ducklings chiefly on corn bread, such as is used on the table, soaked in sweet milk. He feeds five times a day until the young begin to feather, when he feeds but three times.

Don't get the duck brooder hotter than 90 degrees for the start, and gradually lower that temperature as the ducklings grow.

Even James Rankin, who has bred ducks as a business for 40 years, says he is constantly learning something useful and new.

Too wet food is apt to cause diarrhoea. A day of looseness of the bowels will take as much flesh as can be put on in four days' feeding.

It is estimated that laying Pekin ducks will require from 2-3 to 3-4 of a quart of food per day for each duck; or from 66 to 75 quarts per 100 ducks, giving a little more at night than in the morning.

Mr. Rankin says ducklings should be fed 4 times a day until 6 weeks old, then 3 times is sufficient. Until 6 weeks of age, they should be watered only when fed, after that water also between meals.

One of the largest duck raisers on Long Island uses equal parts of cornmeal, wheat bran and a No. 2 grade of flour, and thinks cracker crumbs and boiled eggs are not necessary. He uses about 10 per cent sand.

The American Cultivator, in the market duck's life of 10 weeks, advises for last 2 weeks to feed only morning, noon and night, but for first 8 weeks the feeding hours should be 6 and 10 o'clock morning, 2 and 6 o'clock afternoon.

A reporter of the American Poultry Journal was told by the manager of Chatham Fields plant, that the cost of feed for a duck for 10 weeks is 25 cents. Labor and expenses are about the same, making the total cost 50 cents per duckling.

When ducklings are intended for breeding purposes, the American Cultivator says after the first week the use of equal parts

by bulk of wheat bran, cornmeal and green food, with 5 per cent beef scraps, and 2 per cent coarse sand, will keep them growing.

The American Cultivator recommends this mixture for laying ducks; 50 per cent (by measure) of cornmeal, 15 per cent wheat bran, 15 per cent green food (which in winter must be cooked vegetables, such as potatoes, turnips, beets, etc)., 12 per cent beef scraps, and 8 per cent coarse sand or grit, by measure, not weight. Mix with water to a dry crumbly condition, and feed twice a day, morning and night. After they have stopped laying go back to the ration of equal parts wheat bran and cornmeal, unless it is desired to fatten them, and do not increase the cornmeal until laying time has nearly come round again.

James Rankin, in Reliable Poultry Journal, says the first food he gives ducklings consists of bread or cracker crumbs slightly moistened, and about 10 per cent of hard-boiled eggs, chopped fine, shell and all. To this is mixed 5 per cent of coarse sand. Scatter this food on a board, place the ducklings on it, and they will be busily eating in about 10 minutes. After the 2d day rolled oats and bran can be safely used at 10 days old. Also at this age feed 1-4 meal, the rest wheat bran with a little rolled oats mixed in (not forgetting the grit), about 10 per cent good beef scraps or other animal food, and a little green food as above. At 6 weeks old feed equal parts bran and cornmeal with a little Quaker Oats, also grit and beef scraps. At 8 weeks old; 1 part bran, 3 parts cornmeal, to fatten them, with the grit and beef scraps, but not any green stuff.

Abdormal liver kills many ducks annually.

Geo. H. Pollard, in an instructive article in the Reliable Poultry Journal, says: "How many eggs a duck will lay is an open question. Some of the most prominent breeders claim as high as 140 to 165 eggs from each duck in a season; and they also claim that with fair success one should raise 100 young from each breeding duck. Our record is not complete, and we know of none that is where there is a large flock. We believe, however, that the average total egg yield will prove to be nearer 100 eggs per year, than the higher numbers mentioned. As to the total number of young raised from the eggs laid by each duck, we dislike to hazard an estimate. We may say, however, that we would not place it higher than 25 on an average from large flocks. These figures may occasionally be exceeded by small flocks, and, perhaps, in an exceptionally favorable season, by a large flock, but we believe it is as liberal an estimate as can safely be figured at the present stage of duck culture."

James Rankin says if any one fails in the duck business it must be through his own incompetency and neglect.

Better keep the ducks a little hungry.

Keep the early ducklings for breeding.

An uncomfortable duckling cannot grow.

Do not feed more than will be eaten up clean.

James Rankin says of duck culture: Independent of the elements, affected neither by floods nor draught, heat nor cold, a concentrated cash product turned every three months—it makes the best of any crop on the farm.

In young ducklings, says Mr. Pollard, in Reliable Poultry Journal, overheating causes leg weakness, giddy, whirling spells and spasms—and ends in the bird throwing itself on its side and dying. While shade is an absolutely necessity, they must also have a chance to get as much sun as they require. They will suit themselves according to their needs when sufficient opportunity is provided.

Referring to hatching duck eggs, James Rankin, in "Artificial Incubating and Brooding," says: "See that the heat in the egg chamber is uniform. Use accurate glasses, and place them on the eggs in the centre of the egg chamber. Run them at 102 degrees the first two weeks, and 103 after the animal heat begins to rise. The eggs should be cooled a little once each day after the first week, and longer after the animal heat rises. A little moisture should be used after the 18th day, ventilating a little more towards the end of the hatch."

Geo. H. Pollard, in "Artificial Incubating and Brooding," says: "When the eggs begin to hatch let them strictly alone. Do not try to turn the pipped sides up, and, above all, do not open the machine every few hours to see how they are getting along, or to show inquisitive friends how cunning the little dears look coming out of the shells. After the hatch is fairly well over, and the ducklings nearly or quite dried off, open the machine and quickly take out a tray and cover with a thin woolen cloth. Look the eggs over carefully, and if any are discovered cast in the shell, or with head lightly caught, break away enough of the shell to allow the little bird some freedom of movement and return the tray. Frequently these birds will break through and prove as lively as those earlier hatched. Do not, however, help too much. There is always a percentage of ill-hatched chicks that live only long enough to count one hatched, and then die with their duty fully done."

James Rankin, in the Feather, says: "The amateur can depend on one thing, and that is, that a well-bred Pekin duck is under perfect control, and if she does not promptly respond to generous feed, care and treatment, there is something wrong about it. I have never found it to fail in an experience of nearly 40 years."

Geo. H. Pollard says eggs that produce 65 to 80 per cent. of strong fertility, according to the season, are good; 70 to 75 per cent. is excellent.

The brooding pen should be 7x10, including the hover; the hover, 2x7 feet. The floor should be earth with about an inch of good bedding on it.

Too much moisture is as dangerous in hatching duck eggs as it is with hen eggs.

Rankin says, in hatching duck eggs, it is always best to introduce a little moisture just before the hatch.

Hallock does not allow his young ducklings (up to two or three weeks old) outdoors so long as they are in the regular brooding house.

Eggs for hatching should be kept as near 60 degrees of temperature as possible.

Duck manure ranks next to hog manure for gardening.

For 50 birds (being grown for market) the yard room should be about 30x50 feet.

Fertility and vitality are the keynotes of success.

A. J. Hallock, in "Artificial Incubating and Brooding," says: "It is absolutely essential to success to keep the ducklings warm and comfortable, and their quarters clean. Ducklings that are not kept warm enough can not grow and have a thrifty, healthy appearance; they will be far from it. They will have—we will call it rheumatism—for want of a better name. The symptoms are: The beaks get very pale and soft and grow faster than the ducks. They stand around in a listless manner with backs humped up, and the down standing out straight. The feet and legs get colorless and stiff, and in severe cases they lose control of them entirely. When in this condition the cheapest and quickest cure is a good sharp hatchet applied to the neck. When they have not had sufficient grit and have indigestion they will show some of these symptoms, but not all of them. In fact, a duckling's down will stand up when it is not perfectly well and happy. On the other hand, they must not be kept too warm. The extremes are to be avoided. We can have no 'cast iron rules.' It is necessary to exercise a little judgment. With a bit of close observation any one can soon tell at a glance whether everything is right with the ducklings."

Never overfeed. It is an easy thing to tell when ducks are not hungry; they are slow about coming for their feed. When this is noticed put but little feed down for them, says G. A. McFetridge When ducks are hungry they will remind one of so many pigs. They will run for their feed and tumble heels over head; then they will clean up their regular allowance.

The market carcass should be fat, plump and round.

The duck in good health is always hungry.

In duck culture labor is an important item.

The skin of the market duck should be one color throughout.

One way of making money out of ducks is to have a lot ready to sell when the season opens.

The great secret of fattening ducklings is to be early, and this can only be attained by keeping the stock ducks young, says Geo. A. Palmer. Even as in fowl we get the winter eggs from the pullets, so ducks of the first year will commence laying long before the older ones. We find in practice that it does not answer to keep stock ducks more than two years. They should be hatched in March, and kept after the first few weeks at liberty, as the object here is to build up frame and constitution. It is never wise to breed from young immature stock on both sides, and the finest young will be produced by mating the one-year-old ducks to a two-

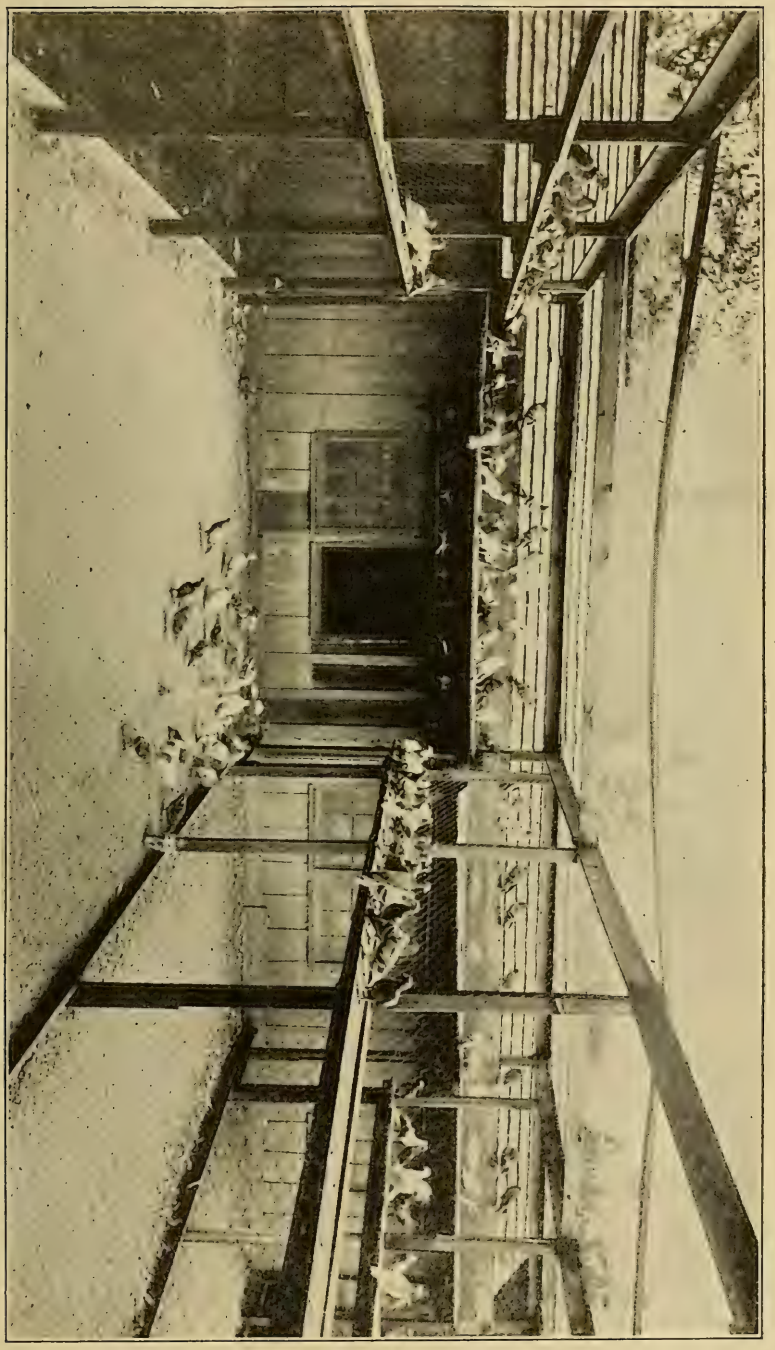

Plate II.—A PEN OF FOUR MONTHS OLD HOMERS.

year-old drake; yet to insure fertility, it is sometimes necessary to use a drake of the first year for the early months.

G. A. McFetridge gives this method of fattening: If the trade calls for yellow skin use yellow corn; if a white skin is more saleable use white corn. A very good feed is composed of one-third cornmeal, one-third middlings, one-third bran. A feed composed of the above will make more muscle and require more time to fatten than when more cornmeal is used. If the demand is for fat, which is the case in New York market, then use one-third cornmeal, one-fourth middlings and one-fourth bran, and about one-eighth beef scraps. Do not use much green stuff while fattening; not more than one-eighth part, as the skin will be affected by the color of the feed. When ducks are put up for fattening, feed light for the first five days, then commence to increase their feed a little each time. You will find that they will eat until they will be unable to swallow the last mouthful, yet they run to the water with that mouthful and mix it with the water and try to drink it. This is the cause of filthy water troughs. It will be necessary to scrub them every day. If this is neglected and the ducks drink from their filthy troughs it will taint their flesh.

Most of the trade for ducks come through the restaurants and mountain house and shore resorts, and in these places they generally serve the duck in quarters, that is, cut into four pieces, so you can easily see that a duck that weighs 4 or 5 lbs. will bring just as much money, so served, as one weighing 6 or 7 lbs.

E. O. Roessle says: The shells of duck eggs being thicker than those of hens, they require more air; hence it is frequently necessary to run the machines with slides wide open, and also to give the trays plenty of cooling by taking them out of the machines and placing them on top, letting the thermometer run down to not lower than 85 degrees.

Col. Roessle says: "I believe that it benefits ducklings quite as much as chicks to let them remain in the bottom of the machine at least 36 hours after they are all hatched. When you wish to remove them, after this time, it is better not to handle them, but place a basket, lined with flannel, close up to the door of the machine; they will scamper into it as soon as the door is dropped."

A young duck will sometimes choke if it has no water to drink when eating. The water must be deep enough to allow the duckling to get its head and bill down into the vessel, says Mirror and Farmer, as with each mouthful it cleans the bill. This is the reason ducklings appear to throw water all over the floor. They are simply cleaning their bills, which prevents clogging of the nostrils, and permits them to breathe. They should have no water to swim in, but water is a necessity with them when feeding, as they wash down the greater portion of the food eaten, some of them apparently not swallowing the food at all.

Col. Roessle, in Country Gentleman, says: "I consider the ducklings first requisite is water to drink. If they do not find it readily it will pay to dip their bills in it. As for food, after exper-

imenting with many kinds, I have decided that the best is a mixture of cornmeal and wheat bran from first to last, in different proportions, according to age. The first feed should be equal parts of the above with a liberal allowance of course builders' sand thrown in and all mixed thoroughly with water, the temperature of the house and not as cold as ice. This should be fed about five times a day, but only as much as they will eat up clean, and when they are actually hungry. If they do not come up to the board with a rush and eat ravenously, then wait a longer time for the next feed. Or, in other words, never under any circumstances overfeed; it is better to feed them short."

Geo. A. Palmer, in Poultry (English) gives the method of fattening in his country: Ducklings will fatten much quicker and better in wire frames than at liberty, and on no account should they be allowed water enough to swim in. The wire frames are 3 feet high and 12 feet square, and can be moved daily on to fresh clean grass. The feed should be well varied. Bone meal is an essential and may be mixed with sharps. Barleymeal and milk, cooked wheat, groats and rice will give them an excellent start, and green food should not be forgotten. Chopped dandelion, onion, lettuce, may be mixed with soft food, and a fair proportion of meat may be given. Greaves broken up fine and mixed with boiling water will answer very well. When cheapness of production is considered before quality of meal, maize may be used freely at the latter end of the 8 or 9 weeks. In any case feed chiefly upon the lighter foods at first, and get on to stronger toward the close, finishing chiefly upon barleymeal and maize. Wheat may be given chiefly as the hard grain, and a little buckwheat and hemp seed will prove useful additions. But remember that milk, when obtainable, will give a great return; that grit is required just as much for duckling as for chicken; that bonemeal has no substitute; that the feeds should be often, early and late, with clean drinking water before them, and there will be no difficulty in getting the ducks off in the first feather, and, what is of more importance, at a profit.

Col. E. O. Roessle, in Country Gentleman, says: "Many experiments have been made in feeding ducklings. I have tried many different methods myself, but there is one on which I have settled that has given me the best results. It is simply cornmeal and bran from start to finish, from hatch to killing time. The proportions of course are changed as the duckling grows. The meal and bran should be made into a moist mash, not sloppy, but more moist than is used for chickens. A feed board should be used, rather than risking the chance of their trampling the food in the earth. To every mess of mash made, a certain proportion of coarse black or builders' sand should be added. For example, to a 12-quart pailful of mash add a half-pint cupful of sand; stir it well into the mash, so that it is mixed thoroughly."

Feed with a strong smell or taste, such as fish or meat, will more or less lend its taint to the flesh of the duckling.

For birds that dress from 12 to 14 lbs. there is some family trade, yet the bulk of the trade does not care for them.

Duck egg shells are very thick; therefore, are more slowly affected by heat or cold. They retain the heat even better than hen's eggs, and it consequently is more difficult to cool them.

To make market ducks pay they must be fed largely on cheap, bulky food like chopped green corn, cut grass and clover, chopped vegetables mixed with grain, and the like, also wheat bran and meat scraps.

In selecting stock for breeding, size of frame, length of body and general activity should be sought for. Without size of body we cannot expect to obtain large ducklings, and the larger they are the better prices they will command.

As the development of the air cell is the all important part in artificial hatching, and as air increases the air cell and moisture retards it, duck's eggs require much more air than hen's eggs, when the moisture and other conditions are equal.

E. O. Roessle says early ducklings are quite as much in demand as early broilers, the prices are quite as good, and the expense of raising decidedly less.

The Country Gentleman says there are many breeders now marketing over 20,000 green ducklings annually, and even at an average of a dollar—it is a nice, tidy business, with plenty of profit at these figures.

The common way of fattening ducks would be to cut off the bran at eight weeks, says George H. Pollard, in American Agriculturist. He does not change the food from the time he begins to give them equal parts of bran and meal right up to the killing time, and so does not have the bother of getting the separate foods mixed. Green food is not given at all to the young ducks, unless they are intended for breeders, and then they are given only a moderate amount of green food. Quicker growth is obtained with beef scraps than with green food.

There is quite a demand for live ducks in all large cities, says the American Agriculturist. The Jewish population will not buy dead fowls of any kind. It is a part of their religion that the poultry should be killed by a rabbi. This makes a good market for many birds that would otherwise be worthless. The Chinese also buy quite a good many and pay very good prices. They perhaps consume quite as many as the Jewish trade. The Chinese and Jewish trade do not seem to be particular about quality, and a good many people ship to them the lame, halt and blind, and in that way are enabled to get rid of ducks that they otherwise could not dispose of.

A cold and wet duckling is apt to go into spasms.

Leg weakness in ducklings is caused by damp quarters at night.

Cold and wet, overfeeding and lice, are the troubles of ducklings.

In feeding ducks cabbage, Waldo F. Brown says he holds the plant in his left hand, head downward, and slashes it in slices with

a corn cutter. He says he can cut a head fine in less time than it takes to write this sentence. Unmerchantable heads, those that burst, and loose heads, are just as good for the poultry as any, and if cabbage is grown for market there will be enough of these to feed a large number of fowls.

To meet with the best success, the duck business should be conducted by artificial methods, as hens will not sit in time to command the high Spring prices.

Ducks that have had very little beef scraps will pick very nicely at 12 or 13 weeks; when fed beef scraps the pin feathers start quite freely at 10 or 11 weeks.

The first essential is to start with good breeding stock. Birds that have been inbred until their constitutions are completely debilitated are in no condition for reproduction.

All breeds of ducks have a disposition to wander more than chickens, but the Pekin as the most domesticated of ducks, lacks disposition to explore and ravage, says Chas. H. Long, in Poultry Herald.

In the South only 3 cents apiece is paid for picking, while in the North from 6 to 8 cents in the charge.

Too often the health of the young bird is injured by the improper feeding of the mother bird during the laying season.

White duck feathers sell for 37 to 39 cents per pound; colored ones 17 to 23 cents.

After a duck gets its age, it is rather deceptive as to weight, as it is then solid and fat.

Cramps occur generally from cold water.

Overfat ducks are easy prey to apoplexy.

Mr. Pollard says one great drawback with ducks is that the shrinkage is so great as compared with other poultry that it seems a high-priced meat.

W. H. Pye, at Eastport, uses 400 to 500 hens for hatching, and uses incubators only when there are no more hens available.

Changes in the bill of fare of the ducks do more to upset the fertility of the eggs than any neglect in providing the essentials.

Duck eggs should never be kept longer than six days, as their fertility is an easy victim to age, and the eggs are apt to smell as soon as they are entrusted to the machine.

Green ducks are shipped with heads on and undrawn. They are picked down one-half of the neck and to the first wing joint.

A dry picked bird holds its color better than one that is scalded.

Green food should compose nearly one-fourth of the whole ration for breeding stock.

Bad eggs in the machine affect the others

The duck business requires skill, practice and study.

A duck can stand poor shelter better than any other fowl.

A dry house and plenty of bedding is the duck's idea of a comfortable home.

A good way to feed green food is to cast it in the drinking water; the ducks love to fish it out.

If the breeding stock has been selected for the brightness of their eyes, for the roundness of their orbs, and for stamina and muscle power in preference to size, weight and sluggishness, they cannot help but give good results.

The main trouble with beginners is that they insist in too closely confining their ducks over night, thereby causing them to feel uncomfortably warm, says Theo. F. Jager, and as this in conducive to start them molting, and as a molt will in each and every case cause a drop in the receipts of the eggs as well as in their fertility, it is easily seen why we should keep the birds from feeling too warm at night.

To show the importance of purity in food, an experience of A. J. Hallock is worth quoting: At one time a lot of ducks were sick, and off their feed; they were dying, and no cause could be discovered. All the ingredients of the soft food were thoroughly examined, and found to be all right, and it was a mystery as to the source of the trouble. Finally, one day the feeder happened to catch the odor from the sand they were using, and found that it was very foul; it had been dug out of the bottom of the creek near where the ducks had run, and was supposed to be all right, but it proved that the leachings from the duck yards had flown down over it, and rendered it impure, and this resulted in the trouble mentioned. The throwing out of this, and the substitution of perfectly clean, pure sand, remedied the difficulty.

James Rankin, in Farm and Home, gives this method of feeding: "For breeding birds, old or young, during the Fall, feed three parts wheat bran, one part crushed oat feed, one part cornmeal, five per cent.. beef scraps, five per cent. grit, and all the green food they will eat in the shape of corn fodder cut fine, clover or oat fodder. Feed this mixture twice a day, all they will eat. For laying birds equal parts of wheat bran and cornmeal, twenty per cent. crushed oat feed, 10 per cent. boiled potatoes and turnips, fifteen per cent. clover rowen, green rye or refuse cabbage chopped fine, five per cent. grit. Feed twice a day all they will eat, with a lunch of corn and oats at noon. Keep grit and oyster shells constantly by them. I never cook food for ducks after they are a week old, but mix it with cold water."

In 1897, Prof. Samuel Cushman gave Rural New-Yorker a very interesting and valuable report of the duck farm owned and operated by George Pollard, of Pawtucket, R. I. We make the following extracts:

Mr. Pollard estimates that he gets about 50 ducks from every 100 eggs put in the machines, not counting the first two and last two hatches, which do not usually turn out so well. Of the early lots of eggs, sometimes 50 per cent are fertile and of these about 50 or 60 per cent hatch. He runs the machines at 102 degrees, and says "of course they vary some, but if the stock is good and the

germs strong, the fertile eggs will hatch if the temperature is anywhere near right."

The eggs are tested on the fifth day, and the infertile ones are sold to cheap markets and to peddlers who supply bakers and restaurants, at the usual price received for ducks' eggs, or about five cents more per dozen than hens' eggs. His egg tester consists of a lamp inside of a box, in the front of which is a hole several inches in diameter covered with rubber cloth, in which is an egg-shaped opening somewhat smaller than the eggs to be tested. Inside the box, back of the lamp, is fastened an ordinary lantern reflector, to concentrate the rays of the lamp on the egg. The tester is well braced and firmly placed, so that the operator can lean against it without stirring it. He does not put pans of water in the machines to make the air moist, until the ducklings pip the shells, then but one pan is placed in each machine. As soon as the ducklings dry off and can stand, they are taken out of the egg trays and put in the bottom of the machine, where they are left from 24 to 36 hours without food or water. Then they are put out in the brooder house under the hot water pipe brooders and are fed and watered immediately. They are given a mixture consisting of bran, two-thirds and corn meal one-third, and this is not cooked or scalded, but is mixed with cold water or skim-milk. He finds that the ducklings do just as well on uncooked food, and that it is unnecessary work to cook it. According to his experience green stuff is not necessary in raising green ducks that are to be killed for market while young. His young ducks were not fed green stuff the past season. Bran answers his purpose just as well. When asked whether green crops that furnished both carbonaceous and nitrogenous matter would not have lessened his grain bill, he remarked that grain had been so cheap the past season that he did not think that it would, besides the flesh of the young ducks would have been softer. His ducks, the marketmen say, are firmer and stand up better than others that are fed differently.

The above mixture is fed for the first four days, after which they are given a mixture consisting of equal parts of corn meal and bran, and seven or eight per cent of beef scraps. After this, the per cent of beef scraps is gradually increased. At three weeks of age, their food contains 15 per cent of beef scraps. This mixture is fed up to the time they are killed. He does not leave off the bran, as some do to make them get extra fat, before they are killed, because he finds that they do not do as well with him. Leaving off the bran stops their eating. It might work with green food, but does not work without it. Feeding green food makes the ducks yellow, and they sell for less. White-skinned ducks and geese are demanded.

The green ducks are usually killed when eight weeks old, when they weigh about nine pounds per pair. Sometimes they are as heavy as 10 pounds per pair at that age. At 10 weeks, they average about 11 pounds per pair, and range from 9 to 14 pounds per pair. They are usually selected and killed when "fit," although the num-

ber killed depends upon the market price and the demand. Mr. Pollard keeps one picker who does nothing during the season but kill and pick ducks and fowls. This man will kill and prepare for market 57 young ducks in eight hours.

The ducks to be killed are confined in two coops in a room adjoining the picking place, to which access is had through hinged doors opening into the picking room. The ducks are thus shut up out of sight, and are much quieter than if confined in sight of the killing operations. As these doors opening into the pens are about shoulder high, the picker can reach in and select one without stooping and with very little disturbance of the rest. The ducks are stuck or bled by opening the bill and making a cross cut in the back of the throat on the inside, so that no wound shows, on the outside. This severs the large arteries and pierces the brain and causes relaxation of the skin and muscles. Immediately after, they are struck on the head with a club, then held over a galvanized iron pail to catch most of the blood, and immediately picked. The picker sits in a chair drawn up alongside a box which is about as high as his knees, into which the feathers are placed. He lays the duck across his lap and holds its head between his knee and the box to prevent its fluttering, and that the blood that escapes may go on the floor instead of on to the feathers. As he removes the feathers, the picker frequently dips his hand or fingers into a dish of water which is always within reach. This causes the feathers to stick to his hand, and enables him to remove them more rapidly and with much less exertion. In removing the pin feathers, they are caught between the blade of a knife held in the hand and the thumb. In this work, the pin feathers are thoroughly wet that they may stick to the thumb and be more easily grasped and plucked. The neck, head and wings are not plucked; the feathers are left on and a string is tied around the body of the bird to bind the wings close to the body. They are never drawn except for private customers. Immediately after they are dressed, they are placed in a barrel or tank of ice water to remove the animal heat, and to shrink the flesh or make them more plump or compact. Here they are kept until they are shipped to market. When sent to New York City, they are packed in ice, but this is not necessary in sending them to Boston and near-by points. Mr. Pollard sends green ducks to market from May 1 to about November, 15, when the last are slaughtered. He supplies the markets in Providence, Pawtucket and vicinity, and sells many ducks direct to the consumers, but the bulk of his product goes to the dealers in the large cities. Green ducks bring the highest price about May 1; from then until July, the price gradually falls. From July to September, the price remains unchanged, but after September 1 again rises and, in October, ducks that it has cost less to raise than the early ones, again bring good prices. In November, western ducks are sent to market, in great numbers, and the price then goes very low.

Prof. Cushman, in American Agriculturist, gives these facts concerning James Rankin's ranch:

The laying ducks were quartered in double-pitched-roof houses about 16 feet wide and of different lengths. One is 200 feet long and others 120, 70 and 60 feet. Three are 30 feet in length and several 11 feet square. They are made of cheap hemlock lumber and covered with standard roofing. The material for one building 120 by 16 feet cost about $100. The interior of this house is divided into pens 12 by 18 feet, with an aisle along the back wide enough for the passage of an attendant with a wheelbarrow. There are three or four sliding half windows in the front of each pen. The indoor partitions are about two feet high. The pens are bedded with meadow hay, and 30 ducks and 6 drakes are quartered in each. A yard 100 feet long and as wide as the pens, made of 30 inch netting, is connected with each. The ducks have access to these both day and night in the summer and during the day, after they have laid, in winter.

When feeding them in winter, the food troughs are placed in the pens near the walk, so as to be reached from the walk, also a box of coarse sand and of crushed oyster shells. Prepared grit is mixed with all soft food. Low nests are arranged along the aisles and the eggs are collected from the walk. These are well bedded with hay, and 90 per cent. of the eggs are clean enough to be used without being washed, an important item.

The laying ducks are removed from their winter quarters about August 1, and the yards are sown with rye, to purify the land and to furnish green feed. The birds are pastured on green sward during the summer. They are removed to a fresh place frequently and these plots are readily distinguished the next season by the dark green color and rank growth of the grass which covers them. Young ducks intended for breeders are also pastured out in this way and both are fed lightly through the summer. Their food is composed largely of bran, with but a very slight proportion of corn meal and mixed into a soft mess, and is given morning and evening. They are fed lightly, because they should forage.

When housed, about November 15, Mr. Rankin gives them twice a day a soft food made of equal parts corn meal, wheat bran and Quaker oat feed, and 12 or 15 per cent beef scraps. To this is added one-fourth part cooked vegetables, like small potatoes, turnips, etc. They are also given all the green rye and refuse cabbage they will eat. A little whole corn is given them at noon but no more food at one time than they can eat up clean. He finds that under such management they lay in about three weeks after being housed. (A young duck can easily be made to lay at five months, old, if desired.) At first the fertility of the eggs is low, but soon becomes high. The average yield of a flock, counting ducks and drakes, will be over 100 eggs per head per year, a high average for one duck being 150 eggs in one season.

L. of C.

About three-fourths of those who take up artificial duck raising make a failure of it because they are not suited to the business. It requires intense application and constant supervision. All hands must be up early and work early and late. Most people are unwilling to put in the 16 to 17 hours required during the long summer days.

We will conclude the duck chapter by making selections from a lengthy article by Prof. Cushman, and which appeared, in 1897, in the Cultivator and Country Gentleman. The article in question is full of encouragement, as it plainly tells the story of how James Rankin, and the Weber Bros., gradually built up a profitable business.

"Thirty or forty years ago, when James Rankin, the pioneer in raising ducks by artificial means, was working out his present system of production, he was a butt for the ridicule of the community in which he lived. Although disappointing failures, attended with much loss, were frequently met with, he persevered in spite of discouragement and at last won victory. By experimenting with different breeds, kinds of food and methods of management, he was enabled, by artificial means, to cause ducks to reproduce when all nature was against it, and therefore realize an immense profit when the product was placed on the market.

"When Mr. Rankin published accounts of his operations, how he could by artificial means produce ducks at a cost for food of about 5 cents per pound, put them on to the market long before naturally reared ducks were ready, and get 40 cents per pound for them, much interest was aroused, but there was skepticism in the minds of many in regard to the practicability of raising any kind of poultry in such large numbers. Others, who did not question the facts as given, were sure that the market would soon be overdone and the price drop to where there would be little profit in the business. But what are the facts? In 1876, when Mr. Rankin first had large numbers for market, no one wanted ducks. For five years he had to visit dealers and drum up trade. Meanwhile the public taste was educated to appreciate roast ducklings at ten weeks, and they soon became popular in market. When Mr. Rankin produced but 1500 yearly, they were hard to sell, but later, though he raised 10,000 each season, he could not fill his orders. Fifteen years ago early ducks brought him 45 cents per pound and late ones not less than 16 cents, and then grain was very high. Now with cheap grain and scores of large duck ranches in various parts of the country turning out thousands annually, the price for the same quality is little or no lower.

"Duck-raising was carried on extensively on Long-Island long before Mr. Rankin's product was put on the New-York market, but his artificial incubators enabled him to produce his ducks earlier, lead the market, and thus get the highest price. Even after the Long-Island raisers had adopted the artificial methods of raising, Mr. Rankin's inland grown scrap-fed ducks were preferred, and he

Plate 12. — DRESSING SQUABS FOR MARKET.

received 20 to 22 cents per pound when the island ducks brought but 16 to 18 cents. The reason was that the latter were fed much fish, which gave their flesh a strong flavor, and the best trade would not touch them. Long-Island raisers were obliged to give up feeding fish and guarantee their ducks not fish-fed in order to secure the same price for the same quality of goods.

At first, Mr. Rankin made blunder after blunder and contended with all sorts of difficulties, because he had little idea of the systematic care and regular feeding required to insure against loss and enable young birds to attain a weight in a few weeks that he supposed required as many months. Although those who attempt to follow in his footsteps have the benefit of his experience, he says about three-fourths make a failure of it. This is because they are not suited to it, will not give the constant attention required, or work 14 to 16 hours every day during the season.

"Quite a number of Mr. Rankin's successful disciples have gone into the business even more extensively than he, and are being rewarded accordingly. A notable example is the case of the Weber Bros., of Norfolk County, Mass., just south of Boston.

"Mr. Weber, the father, a German who had worked with his sons in a leather factory ever since he came to this country, was tempted to leave the factory and take his family out into the country and try farming. He was familiar with farming in Germany, where scientific methods are more generally followed than here, and thought he might be able to do well on the farm. A suitable place was selected, partly paid for and farming undertaken. The family—father, four sons and two daughters—were strong and hardy, and worked early and late, but found they barely made a living. They cultivated various crops and kept 18 cows, but could not more than pay their expenses, to say nothing of paying the balance due for the farm. It was so hard to get any money for what was produced that after farming for six years they felt obliged to look for some other source of income. Hearing of Mr. Rankin's profits in producing large quantities of chickens and ducks, they, in 1888, visited him, learned his ideas and at first tried chickens. They bought of him 300 eggs, hatched 180 chickens, nearly all of which were raised, and were sold in May for $1.25 each. As one of the Webers said, the amount received was more money than they had taken at one time since they had been on the farm. This encouraged them, and duck raising was commenced. In 1889 they raised 800 chickens and 500 ducks. In 1890, when they were $3000 in debt, they bought two 600 egg incubators, and from 40 breeding ducks hatched 3000 ducklings. From 200 to 300 chickens were also raised. That year they marketed 2800 young ducks. By doing all the work themselves—the father and three sons—they cleared $1800 that season. When they were killing and shipping two barrels of ducks per day, they received $120 per shipment.

"In 1891, 150 breeding ducks were kept, six 600-egg incubators used, 4000 ducklings hatched and 800 chickens, and only about 3000 marketed and $2000 cleared; this season the price of grain

was high. In 1892, 280 breeding ducks were kept, ten 600-egg incubators used, 6000 ducks marketed, and $2000 cleared. In 1893, 350 breeding ducks were kept, ten 600-egg machines used, 6000 ducks marketed, and $2000 cleared.

"In 1894, with the same number of breeding ducks and machines, 8000 ducklings were hatched 7000 marketed and nearly $3000 cleared. In 1895, from 500 breeders, and 14 machines, 9500 ducklings were marketed and $4000 cleared. Last season from 500 breeders and 18 machines, 21,000 ducklings were hatched 19,000 sold and between $7000 to $8000 secured.

"They have paid for the place, built a new dwelling house, and spent $2000 on buildings and other improvements. Their farm now represents an investment of $20,000, and they are free from debt.

"During the height of this season they feed 14 tons of grain per week. The requirements of 500 breeding ducks are five bushels of grain and one barrel of turnips per day, beside green food.

"They do not cook the feed, but mix it with the hot cooked vegetables, so it is thoroughly warmed. They use a 60-gallon and a 30-gallon set kettle for boiling vegetables and heating water. The feeding is done throughout the season by two men with the assistance of two boys. In all 14 persons are employed on the place from May until September.

"The farming now done is mostly the raising of vegetables and green crops for the ducks. The quantity of manure produced is much greater than when 18 cows were kept, and the land, once quite poor, now grows great crops. Where ducks are yarded, the manure must be scraped off and removed, and rye or some other crop grown each season to purify the land. They raise 500 bushels turnips, the variety preferred being the yellow Swedish turnip, and 100 bushels carrots, as well as the rye and corn fodder. They use 200 head of cabbage during the season.

"As it is the early ducks that pay the best they aim to secure fertile eggs, having strong germs, early in the winter, and do excel in this respect.

"The old ducks do not usually lay much before February; so young ducks are depended upon for early market production, the mature old birds being used in the production of breeding stock. While they are able to induce their young ducks to lay as early as they wish, they cannot persuade the drakes to fulfill their part of the programme much before New Year; therefore young ducks are not encouraged to lay much before that time. They prefer for breeders, ducks that weigh eight pounds and drakes that weigh twelve pounds when mature. A thirteen-pound drake is too heavy. They are selected in July from the April-hatched birds and only from those that were raised from mature stock, yearlings or two year-olds. They are chosen for depth of keel, size, weight and plumpness. They are then put in large yards, where they have access to grass pasturage and have much freedom and are fed more growing food than is given those that are to be fatted for market. This consists of equal parts of shorts, gluten feed and ground oats.

to which is added five per cent. of beef scraps, and it is given them twice daily. At this time they are also mated just as they are to be bred the following season. Beginners usually mate ducks too late in the season; it should always be done by November 1, to insure best results.

"During the summer and early fall these birds are not housed at night but allowed access to a house that is openly built of boards and is without windows, which gives them shade or shelter. About November 15, they are placed in the houses for laying ducks and allowed the liberty of a yard 100 by 20 feet during the day. They are then fed twice daily on a mixture of equal parts shorts and ground oats, to which is added five per cent. beef scraps.

"About Christmas, when grass and green rye are no longer available, corn meal is substituted for the ground oats and ten per cent. of beef scraps given instead of five per cent. To the mixture is also added one-fifth part of boiled vegetables—beets, turnips, or carrots cut up in a root cutter and cooked in a boiler. They are also fed cut raw cabbage and raw turnips, two or three times per week. The raw cabbage is cut in a root cutter and the turnips in a bone cutter. The cabbage fed is never cooked. They estimate that they receive an average of 150 eggs per duck during the season. Most of the eggs laid before January are sold in the market. The clear infertile eggs, tested out on the fifth day of incubation are also sold throughout the season. The production of ducks' eggs to sell in the market they do not consider profitable.

"They have no ponds for their ducks, but by the above method of feeding they have no trouble to get eggs that will hatch from January 1 until August. During the season of 1896 fully seventy-five per cent. of their ducks' eggs were fertile, and of all eggs put in the machine fifty-eight per cent hatched. About January 1, 1896, their ducks were laying about sixty eggs per day. In March they were getting 480 eggs per day from 520 ducks. On February 10, 1897, they received about 400 eggs from 600 laying ducks of which 425 were young ducks, 29 eggs being picked up from a pen of 30 young birds. They also had at this date no ducklings, but had 4,000 fertile eggs in their incubators. On February 23, they had 800 ducklings and 5,200 fertile eggs in their machines.

"The point is to get the ducklings into market when they bring $1.25 to $2 each.

"Their houses for laying ducks, are 85 feet long, 18 feet wide, 6 feet high in the rear, 4 feet high at the front, 12 feet high at the ridge, and cost, covered with Neponset, $150 each. They are high and airy and make excellent winter quarters. They are divided up into pens 20 by 15 feet, leaving a three-foot passageway along the back of the building. In the front there are two ordinary half windows to each pen, and a door for the ducks. There is a window every 20 feet in the back of these buildings for ventilation. In summer the sashes are taken out and the openings covered with netting. In cleaning out the building the litter is thrown out through the front windows where it can be conveniently removed by team. The

floor is well bedded with sawdust and in mid-winter with meadow hay.

"During the laying season the ducks are kept shut in the house until 9 o'clock in the morning, that they may lay in the house instead of on the ground in the yard. No boxes are furnished for nests; they make their own right in the sawdust.

"During the winter one drake is provided for every five ducks, but after June 1st one is sufficient for ten ducks, and it is then best to lessen the number of drakes one-half.

"Pekin ducks are very nervous timid creatures, and at night will dodge the shadow from a light in great terror. If startled in the dark by one jostling against another, they become so frightened that the whole lot may rush about in excitement and terror until morning. Unless this is prevented, they run off much flesh in a very short time and otherwise injure themselves. To prevent loss in this way, the Webers light the houses and yards at night. Every house and yard where ducks that have feathered out are kept is provided with a large street lamp such as are frequently used for lighting country towns. Young ducks while in the brooders do not need to have their quarters illuminated at night.

"During the height of the incubating season, the Webers fill a six hundred (hen) egg incubator every other day and therefore have a machine hatching ducklings every two days.

"Usually it takes about two days for all the ducklings to hatch. Twice each day, those that have dried off are put beneath the trays, where they are left for 24 hours and then transferred to the brooder-house, where they are at once watered and fed with rolled oats and bread crumbs. Each downy duckling is counted as they are taken from the box in which they are brought from the incubators, their bills dipped in a pail of water, and then dropped upon the feed board covered with bread crumbs. When their beak touches the board, some of the dry food adheres to it, is tasted and immediately they search for more. As soon as they have eaten, they are put under the hovers, which are at first kept at 100° and then gradually reduced in about four days to 80°. The Webers buy stale bakers' bread by the ton. They have no bowel trouble among their ducklings, because they are so strong and vigorous. It is only those that have weak vitality that die. These little ducklings are fed the above five times daily for about a week. The very early ducks are fed on rolled oats and sweet milk until they are two weeks old and sometimes longer.

"At three weeks of age a more growing food is given the young ducks. This is composed of equal parts shorts, gluten feed and ground oats, to which is added five per cent. beef scraps. Enough 'red dog" flour or fine middlings is added to make it stick together. This is fed four times daily. The food is fed in troughs. Wooden troughs eight inches deep, nine or ten broad and five by fourteen feet long also make the best receptacles for water. Green food is also given them once per day. At eight weeks of age their food consists of four-fifths corn meal and one-fifth low grade flour and

ten per cent. beef scraps, and is given three times daily. They receive once per day all the clover or fodder corn cut up fine that they can eat. The ducklings are fed green food from start to finish. The Webers find waste lettuce leaves most excellent for little ducklings and they buy them by the wagon load when they can get them, and think of putting up a hot-house in which they may raise lettuce sown broadcast. They buy daily many cans of skimmed milk at 6 and 7 cents per can of 8½ quarts and mix it with the food for fattening ducks. As soon as the young ducks reach a weight of 5 lb., which they do at about ten weeks, they are killed and marketed.

"If one should ask the Weber Bros. what are the worst snags to be avoided in following this business, they would probably say: Do not breed "in and in" or raise breeding stock from anything younger than yearlings. Do not fail to give your young birds, to be used for breeders, more growing food and more freedom than you give the ducks that are fatted and killed. Mate up before November 1, and be sure to feed plenty of cooked vegetables and green food as well as the right grain, if you want the eggs to be fertilized early in the year.

"Their unusual success in securing a high per cent. of fertile eggs early in the season should cause the beginner in artificial duck culture, at least, to heed this advice in every particular."

CHAPTER X.

Turkey and Guinea Broilers for Market—Valuable Pointers on the Care and Marketing of Turkeys.

The Feather, of Washington, D. C., published the following, which is not only interesting but instructive reading:

The use of the turkey broilers in all of the clubhouses, restaurants and high quality hotels in the large cities is greatly on the increase. For the purpose of information a number of chefs in the many popular resorts of the cities have been interviewed on the consumption of turkey poults, and general opinion seems to be that the people would gladly use them if they could only have them during a continued season of the year, but few of them ever reach the market. The use of turkey poults for broilers might be made profitable to those who do not hatch the turkey eggs that are laid late in the season simply because it is thoroughly understood that these late hatched poults cannot be grown to roasting size in time for the winter sales. Such late hatched poults never make good large-sized turkeys.

But all of these eggs that are laid late in the season might be readily hatched and raised, and as soon as the young poults reach the broiler size they may be disposed of for turkey broilers in the city markets. It seems scarcely probable that there is a possibility of overdoing this, and those who make the attempt to grow these late hatched poults to turkey broilers should make their plans for disposing of these some time ahead of the time when they are fit for broilers. This can be done through correspondence with the commission or poultry dealers of the large cities.

It is always better to communicate with these dealers and find out from them just when the demand will be the best for these turkey broilers, how they wish to have them dressed, and what days in the week would be the best for the product to reach the market.

All these little conditions should be thought of and attended to in advance so that there will not be the possibility of killing and dressing the turkey broilers and sending them into market without knowing just when and where the demand will be. Quite often the market is glutted on certain days because every one seems to think that they should all ship on a certain day. If it is the hope of a locality to ship to market all their product on Monday, those who delay shipping until Tuesday night usually get the best of the bargain. This simply illustrates the fact that one should be careful and watch out so as not to ship into market the products until they

are needed. Always try to be in communication with some one as to the best time to ship, and by taking advantage of this it will be possible at all times to dispose of everything that you have to sell at a profit. Never get caught on an overloaded market and lose the whole shipment.

Guinea Broilers.

The demand for Guinea hens of all sizes and ages is largely on the increase.

The Guinea broiler at a pound each was very popular the past season at watering places and in the cities as well. The Guinea broiler at about a pound or a pound and a quarter can be made use of as a substitute for many kinds of game birds, and while it may be considerable time before they will be as extensively used as are the broiler chicken the day is not far distant when every single Guinea broiler that can be grown will have ready sale in the city markets. The laws prohibiting the cold storage of game birds, selling them out of season, has made it necessary for the high class restaurants and hotels to have a substitute for game birds. There seems to be nothing that meets the demand so well as does the Guinea broiler except the home grown or domestic pheasant.

The increasing scarcity of game has increased the demand for various poultry products out of the usual line. Among these are turkey broilers, squabs, small chicken broilers, and Guinea broilers. A New York dealer who has had to pay top prices for young Guinea chickens writes as follows with regard to this specialty:

"Young Guineas have been coming into favor since the passage of the stringent game laws which have prevented dealers and restaurant men from getting sufficient game to supply their wants. The Guineas are wanted when weighing from three-quarters to 1½ pounds delivered dead with feathers on and selling at $1 per pair. The restaurant men and summer-hotel people will take all they can get."

Pointers on Turkeys.

Take young turkeys from the nest as soon as they are dry, to prevent them from mashing, wrap them up and keep in a warm place, says a correspondent in American Agriculturist. Give no food for a day and night; there is a residium of yolk to be adsorbed and voided. Too early feeding interferes with this process.

Cloud's Poultry News gives these pointers: As killing time draws nearer feed oftener. Give a variety. Don't depend on corn alone, and don't expect to make good turkeys with sour, damaged grain. Select the best hens for breeding purposes, and do not sell these nor exchange for poor stock. Don't take everyone's advice on how to grow turkeys. Find out for yourself.

Mrs. Magruder, after first week gives her turkeys curds of buttermilk or clabber, scalded and pressed dry from whey. Sprinkles occasionally with red pepper. Also feeds plain corn cake, unsalted, crumbled find and moistened with a little water or sweet milk; these are the proper foods for young turkeys. Feeds four or five

times a day, in an earthenware plate or vessel. Turkeys are fastidious as to clean platters and food. Does not give raw meal, dough, buttermilk or sour milk. These produce diarrhoea, and this disease is the mortal foe of the turks.

The best way to kill turkeys is to tie their feet together, hang the bird on a pole, cut the throat so as to bleed freely. Dry pick them, leaving head and wings on. After picked, dip in hot water, and then in cold. This will give the skin a fresher look.

Stock should be changed as often as every third year, says Miss E. A. Murray, in Farm and Home. Nature puts her protest on inbreeding by giving warning, with club-footed and ill-conditioned chicks.

When a turkey is the least bit indisposed, it will draw its head down between its shoulders and refuse food.

"In spite of all our care, young turkeys have a disagreeable habit of dying," writes Miss E. A. Murray. "The causes are filth, close confinement and improper food. Prevention is better than cure. I do not have much luck in doctoring the symptoms. I try to remove the cause. I occasionally use a few remedies, a little hot milk for a weakling, a little cayenne pepper in their food, a small dose of sweet oil for constipation, thorough searching for lice, and greasing under the wings for the same. For gapes the same remedies we apply as to chickens. I never saw a turkey that got its living in the fields that had the gapes."

"The gobbler comes in as a factor," writes Miss Murray. "If he is what he ought to be, he will go with the mother, help her take care of the chicks during the day, and hover over them at night, and if she lays again, take entire charge of the flock. I have seen hen turkeys fly up into a tree with the older ones, and leave the younger ones on the ground, and my old fine gobbler has come down off his perch and hovered them night after night. I have seen him coax with exquisite tact and patience, the timid turkeys raised by a hen, and when he succeeded in gaining their confidence, what a proud and loving father he was."

The editor of the Poultry Chum, who is also an extensive turkey grower, made the experiment of placing four birds in a pen and feeding meal, boiled potatoes and oats. Four other turkeys of the same brood were at the same time confined in another pen and fed the same diet, but with the addition of a pint of very finely pulverized charcoal mixed with their food. They had also a plentiful supply of broken charcoal in their pen. The eight were killed the same day, and there was a difference of one and a half pounds each in favor of the fowls which had been supplied with charcoal, they being much the fattest, and the meat being superior in point of tenderness and flavor.

Prof. Cushman, in American Agriculturist, says if the little turkeys die immediately after hatching, and before they have been fed or watered, they probably are from weak or runout stock, or have been improperly incubated.

I have learned by experience that the more you let a turkey alone after it is big enough to hunt, the better it is off, says a correspondent in Western Rural. Feed them regularly, let them roost out of doors, and they are a very healthy fowl.

You never lose money on young and growing turkeys if you keep them until after the holidays are over, says Western Rural. Turkeys are light eaters in the whole, and constantly growing until one year old, and it costs no more to raise a good sized turkey than a little one.

At certain seasons of the year turkeys are in great demand, says Iowa Homestead, and it is safe to say that a pound of turkey meat is worth as much as one and one-half to two pounds of pork, and often three times as much, although the cost of the two does not differ greatly.

Potatoes, swedes, mangolds, boiled soft and mixed with ground oats, barleymeal, buckwheatmeal or cornmeal constitute good fattening foods. The French fatten with beetroot, artichokes or potatoes, boiled and mixed with meal, and give acorns, chestnuts and walnuts. The latter, they consider, give a delicious flavor to the meat.

When you handle your turkeys, especially if they are large ones, be careful about their claws, writes C. P. Reynolds, in American Fancier. A slight scratch is quite painful and may even prove serious. The writer has just had a little practical experience in this line and a "game" hand is the result. A gloved hand is the safest.

W. H. Rudd, in American Agriculturist, says there has been quite a demand for young turkeys to broil, during the early and late summer, for several years past, and the demand seems to be increasing. We should think a good weight at three months of age would be three to four pounds each, and this is the weight desired for broilers.

The question is often asked, can turkeys eggs be successfully hatched under common hens? says a writer in Tri-State News. There is no doubt but what it can be done, as has been repeatedly demonstrated, but whether one can get the best quality of stock from poults so hatched and reared, is quite a different matter. We have entirely given up the idea of trying to raise young turkeys by any means other than by their natural mothers. While it is very true that turkeys can be reared by domestic hens with more or less success, it is entirely impossible to attain the lusty, vigorous growth of stock that have developed under the charge of the mother turkey.

Perches should not be more than two feet from the ground.

Scalded curd or ordinary Dutch cheese is the ideal food for young turkeys.

Nothing is so objectionable as a turkey with a crooked breast when trussed.

Some turkey raisers do not give the young water to drink until they are a month old.

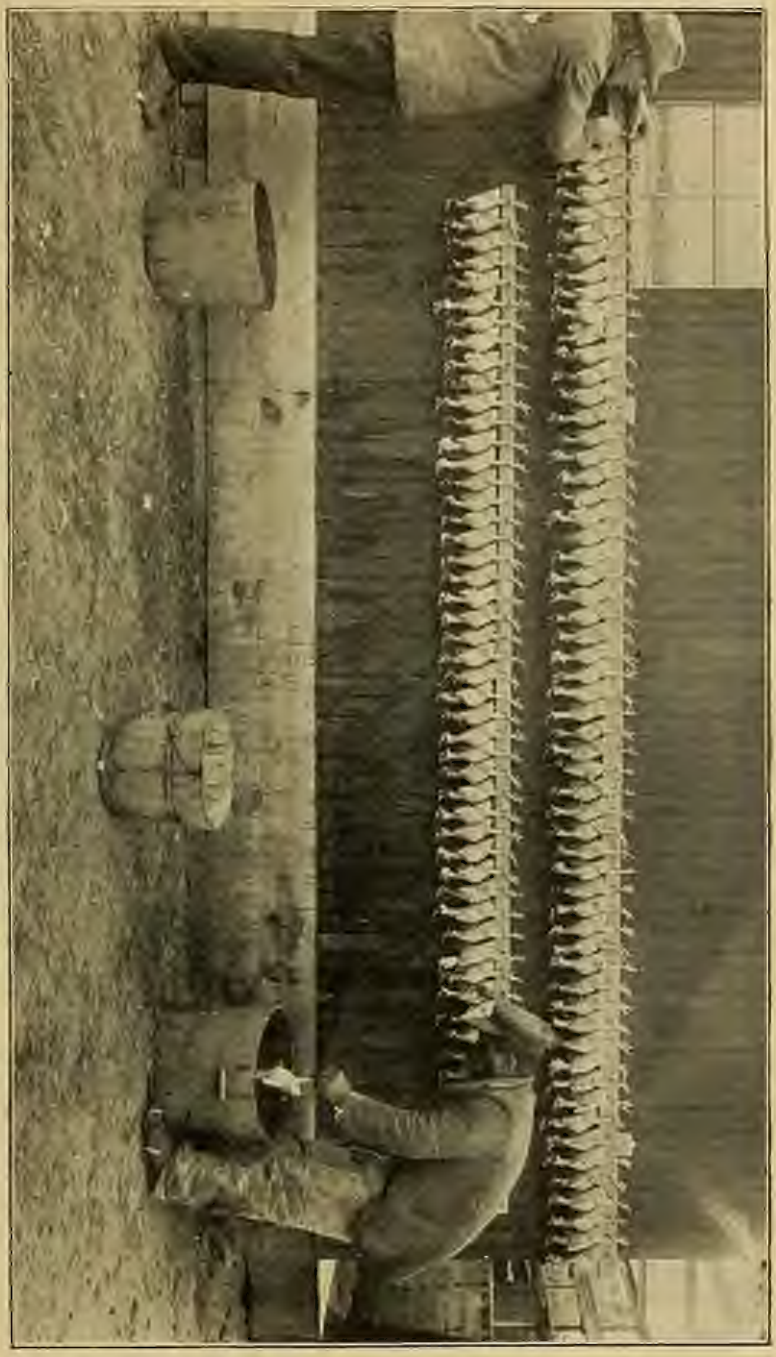

Plate 13. — ONE HUNDRED AND SIX SQUABS READY FOR SHIPMENT.

While fattening, turkeys require plenty of ventilation, fresh air, and should have a good supply of grit, sand and lime rubbish to aid digestion.

Three weeks are considered sufficient time for fattening the hens, and a little longer for the cocks, provided the birds are in good condition when put up.

"I would not advise anyone, however, to embark in turkey rearing unless the locality be a dry one; for a damp, marshy, cold soil is fatal, and no amount of drainage can make it fit for turkeys," writes a correspondent in Rural New-Yorker. "No matter how rocky, sandy or broken it may be, the fowls will be healthy; in fact, if the soil does not contain sand and gravel, both should be provided."

The turkey crop hatched previous to June 1 should attain good growth by last of November, the cock birds reaching 10 or 12 pounds.

Charcoal is a valuable article in the diet of turkeys, both old and young.

A Kansas lady feeds her turkey chicks every two hours for the first 10 days.

Geo. Enty says that on any ground upon which people can live turkeys will thrive.

Patience should be the rule in raising turkeys.

A little sand should be mixed daily with soft feed for the young.

Cleanliness prevents much of the mortality among the young.

Turkeys cannot be successfully brooded artificially.

The bulk of the turkey crop is brought out by hens.

The largest flocks and the most thrifty looking turkeys, are found on farms having high, dry land, which has a light growth of grass, and where a new breeding gobbler has lately been introduced.

"Whatever you feed, don't feed wheat bread; you might as well feed them putty, in my opinion. Though only a farmer's wife, I have had good success raising turkeys on a small scale for twenty years," says Mrs. Lottie E. Waring, in Coleman's Rural World.

Infertility in turkey eggs is mainly due to an overfat condition of the breeding stock.

Fermentation in the crop, common in turkeys, is prevented in the feeding of charcoal.

If you begin feeding the turkeys off a board, it will be difficult to get them to eat off the ground, and vice-versa.

It is said that in Scotland when the young turkeys droop they are given a drop of whisky; in France they get a teaspoonful of wine.

Mrs. Stella G. Northington, in Fancy Fowls, advises granulated oatmeal, cracked corn and whole wheat as a good evening ration for young turkeys.

A single union of a male and female fertilizes all the eggs the hen will lay for one season, hence one gobbler will suffice for twenty or more hens.

Young gobblers may be distinguished from the females by being heavier, more masculine in appearance, more caruncutated on the head, and a development of the "lassels" on the breast, says Poultry and Pets. A little experience may be required at first.

It is not the largest turkey that sells soonest, says Poultry Keeper, but the fat and plump bird, of medium size, for which an extra price can be obtained at all seasons.

At the age when turkeys begin to acquire the red head, possibly it is accompanied by a fever similar to the moulting fever in fowls, says a New York turkey raiser. At this period, feed well and watch for vermin. The "head louse" is found on top of head, nape of neck and under the ears. Dust frequently with insect powder or grease with lard. The small gray "mite" is hard to find; it clings closely under the throat and beneath the wings, and is the most blood thirsty of the vermin. Anoint well with lard, into which is mixed a little coal oil. Use the kerosene wash and sulphur freely about the coops and roosting place. On the ninth week the brood may be left to care for themselves night and morning.

Tame the young turkeys so they will eat from your hand, and they will not be frightened when you are compelled to handle them.

The common run of turkeys sent to the New York markets do not average more than 8 or 9 pounds.

R. E. Phelps, in American Agriculturist, says the first requisite in turkey raising is good stock. The fowls should be healthy, of good shape, with heavy bodies and not too much leg; the hens either one or two years old. If older the eggs are fewer in number and more likely to have soft shells. The gobbler should be well matured, and weigh not less than 18 to 20 pounds. Gobblers and hens should never be selected from the same flock.

Mrs. Cora Halbrook, in Poultry Keeper, prepares the nests for sitting hens on turkey eggs, as follows: "Prepare the nest by taking several newspapers, put them all around and all over the nests, and just leave a piece large enough for the hen to get out or in. Then put about 2½ inches of ashes on the paper, and cover with enough hay to keep the eggs off the ashes. Then I tie moth balls in small rags, one in a rag, and place two of these in a nest, which I think prevent lice. You can get a pint for five cents: (they are very poisonous and must be kept away from children). We set 11 eggs under a hen."

Turkey raisers make a mistake when they sell off all there older birds and retain young ones for breeding purposes, says Texas Farm and Ranch. The turkey is not fully mature until two years, is at its best at three years, and nearly as good at four.

In killing, bleed freely.

After the holidays 8 to 10 pound birds sell best.

Give fattening turkeys all the clean water they will drink.

A cock at 12 months of age should range 16 to 20 odd pounds, according to the breed and how they are cared for.

Rural New-Yorker gives the following pointers on marketing turkey feathers: The quills from the third joint or tip end of the wing are called pointers, and should be kept separate. In packing, keep tail and wing feathers separate. Tie each kind in bundles by itself, and press the bundles in the boxes tightly. All feathers must be clean, sound and dry-picked. The wing quills which have full plumage on both sides of the quill, which come from the first and second joints of the wing next the body, are more valuable than, and should be kept separate from, the pointers. The tail feathers should be kept by themselves, and are the most available. The short tail and wing quills, if saved, should be kept separate from the long ones, as they depreciate their value if mixed with them. Prices in New York are about as follows: Prime tail quills, from 25 to 30 cents per pound; mixed tail and wing quills, about 20 cents per pound; mixed wing, tail and pointer quills, about 12 to 15 cents per pound; short tail and wing quills, about 7 to 8 cents per pound; pointers, about 4 cents per pound. The directions for shipping are to mark the correct weight and tare on the boxes, also the name of the shipper, and ship as "turkey quills." The prices named may vary from time to time, but are approximately correct.

A correspondent in American Agriculturist gives this method for fattening choice turkeys: In the morning feed a mash composed of corn, barley or buckwheat meal, mixed with skim milk, and a few sweet potatoes added, with some sharp grit to aid digestion. Also mix with this feed a good brand of condition powder; it sharpens the appetite, and causes them to gain flesh faster. At noon give cracked corn, buckwheat or barley, and at night give a supper of whole or cracked corn, with an occasional feed of buckwheat. Do not use new corn, as it is apt to produce bowel trouble, but feed well seasoned corn, one year old. That over one year old is apt to make the flesh courser and not so white and delicate as that fed on nice, white one-year-old corn. It is best not to coop turkeys while fattening; they almost invariably lose their appetites and become sickly. Turkeys are very active and must have plenty of fresh air and liberty or they will not thrive. If fed all they will eat three times a day, they are not inclined to roam, but will sit around quietly and will seem to enjoy resting in the sunshine. Turkeys intended for the later markets should not be so heavily fed as those intended for sale in a few weeks. Long continued heavy feeding is not profitable and is a source of great loss among turkey growers. Turkeys should be killed at once when ready for market. If kept over this time they soon begin to lose in flesh and will prove unprofitable.

While it is undoubtedly good for the turkeys to roost out of doors during the warm weather of summer, as well as the pleasant fall months, we cannot think but that having been exposed all winter to the fierceness of the blasts, will injure them more or less, says American Stock-Keeper. Feeding the turkeys regularly, and afterward driving them every eve into a commodious shed where they

can find accommodations for roosting, they will soon learn, to seek that shelter for the night, and will be more secure from the depredations of poultry thieves.

A Canadian correspondent of the American Agriculturist says turkeys are as easy to raise as chickens if one has the right stock. But most people pick out all the largest birds to market at Thanksgiving and Christmas, and keep the small ones, with the impression that they will grow if given time. This is a great mistake, as in a flock you will always find a few better developed, bigger-boned birds, and these invariably have the constitution we need for breeding purposes. To make a success select the best hens in the flock; good deep, plucky birds, with big bone and short legs, and dispose of the long-legged, loose-built ones. He finds the Bronze the hardiest, but a cross with the wild would perhaps still further improve them. The biggest drawback with the wild cross is, they are hard to keep near the home, and are easily frightened. Having selected your breeding stock, which is best to do in the fall, winter them and let them run out all the time.

An English turkey raiser says: "I make it a hard and fast rule (if at home) to feed my turkeys myself every morning, as by so doing, I see at once if any of the birds are ailing. If ever you see a turkey refusing its morning meal, you may be quite sure it requires attention. Sometimes, when 5 or 6 months old, you see one lagging behind the rest, and either refusing food altogether or just pecking a few grains, then walk away. Taken in time this state of affairs is soon remedied. Catch the turkey and put in a warm, dry building, and mix half a teaspoonful of lard, or unsalted butter, with a half teaspoonful of cayenne pepper, and make it into small pills with a little flour. These pills I give at night and feed very sparingly next day. The following morning the bird generally goes out all right, and quite ready for breakfast. Should this not be the case, I have often given half of one of Carter's Little Liver Pills with good effect."

About four dozen eggs are given as an average for the annual output of the turkey.

The first eight weeks of the young turkeys life require constant care.

Even July hatched turkeys can be made profitable.

Seven eggs is about all a common hen can cover.

Keep the young shut up while the dew is on the grass.

L. V. Hopkins, in American Agriculturist, says the first dose that he gives his little turkeys is a pill in the shape of one whole black pepper. Each little mouth is forced open and the pepper pressed down.

"I have always thought that the delicacy of young turkeys is due in a measure to the rapidity with which feathers are grown," says L. V. Hopkins. A young chicken retains its down for several weeks until its body is well grown, but a young turkey begins at once to put out large feathers on its wings and tail. This enormous feather growth saps the vitality of the body and leaves it an easy

prey to weakness and disease. To overcome this tendency should be the aim of every breeder.

The following method of fattening for market is recommended by Mrs. A. W. Trumble, in Practical Farmer: "Usually fed corn exclusively, but sometimes would feed small potatoes cooked and mashed with cornmeal, fed warm. They were always fed all they would eat but had their liberty, never shutting up until the day before killing. They were dressed in best possible manner and sent to a city market a few days before Thanksgiving Day, and I never remember getting a low price. We kept no pure breed. I think a medium-size turkey sells better and will be full grown and plump, while the extra large take longer to mature and if dressed before fully grown often show pin feathers."

The most delicious, juicy broiler that an epicure can fancy is a turkey poult of about six pound weight, or when about two-thirds grown, and of medium size. Many a young male two-thirds grown would be too large to broil; if rather large, however, the breast may be gushed, and thus more easily cooked through, but it must not be dried.

The Epitomist advises, when the wings of the turkey begin to be the largest part of it, take the poult up and pull two or three of the long feathers out of the wings at the point, holding the wing tightly and giving a quick jerk. We do not know what causes these long feathers to grow in, but we do know that when they are pulled out the chances are very good for that turkey to grace a Thanksgiving festival.

Turkeys like to roost as high as possible in the house; therefore, the perches should be on a level to prevent them breathing foul air, as they are more subject to roup and cold than any other fowls.

It should always be borne in mind that unless the stock birds are large it is impossible to get the young ones to a good weight; therefore it is best to purchase the largest and finest stock obtainable to breed from.

Many farmers allow their young turkeys to run in the stubble fields, which is a good plan, as they not only pick up a great deal of loose corn, but often get dainty morsels of green stuff, besides which they have plenty of fresh air and exercise.

Let no novice in this business suppose he can succeed without great care and prudence. Young turkeys are the most tender of all young fowls, and need the most care. This care commences with a good selection of the finest, earliest and heaviest turkeys for breeders.

The American Poultry Journal gives this method for fattening for market when fattening time comes: The turkeys should be confined in a shed spacious enough to let them move about somewhat, but not large enough to grant them exercise. Low roosts should be placed. Half an hour in the morning ought to be allowed them for roaming about outside, where grit can be found and where they can stretch their legs. After that they should be called into the shed, by feeding them only in that spot, and so left for the day.

On cold wet days they need not be let out. The feed should be put into troughs, set low on a broad base, and located where the fowls will not soil them. The feeding place might be under a shed adjoining the shed where they roost. The morning meal at first may consist of barley meal and middlings; and skim milk is desirable as a mixing fluid. Oatmeal is proper as the days go on, and minced fat should be added during the last 10 days. The evening meal should include boiled corn, and the mess ought to be mixed stiffer than for the morning feed. Whole grain is good in moderation, scattered on the ground.

Never feed cornmeal to young.

As a rule, turkey eggs hatch well.

Don't breed from excessive weights.

Medium-sized but plump turkeys are marketable all the year round, so that at any time when there is a surplus they may be sold at fair prices, but to secure the best prices they must be young and in a good marketable condition, not too fat and not too large.

J. F. Crangle says a pasture is a good place for poults. Free range gives the best turkeys. Teach them to come home to feed at a particular place. He says they never lose over ten per cent. of the poults, these mostly by foxes and hawks. He believes that more money can be made in turkeys than in any other branch of poultry for farmers.

"I do not wonder that there are so many failures made in preparing turkeys for market when we take into consideration the course so many breeders take in fattening their birds," says George Wolf, in Farm-Poultry. "I have frequently seen flocks of turkeys penned up in a building for the purpose of fattening for market, and it was a failure every time. This is no more than should be expected, for turkeys are of a wild nature, and as soon as they are cooped they begin quarreling, chasing one another about and constantly worrying for freedom. They soon tire of their food, grow thin and will, when killing time comes, weigh less then when first cooped with the expectation of fattening them."

"If I had a healthy, vigorous lot of turkeys that I wanted to prepare for market," says George Wolf, in Farm-Poultry, "I would give them absolute freedom and all the clean water they would drink. The fattening process would continue through weeks and at no time would I give them quite all they would eat, for as sure as you overfeed you will begin to notice sick birds in the flock. I would feed corn of last season's crop, and mash should be cold, fed in a long trough that is kept perfectly clean, and grit of some kind should be placed where they could always get it. My object in making them pick the corn from the cob is to give them exercise and because they will not roam as far from home if kept busy for an hour or so picking corn."

George M. Tucker, in Farm and Home, says he has found that turkeys raised from the same cock and hens will after a few years, be liable to crooked breasts and other deformities.

Indigestion destroys many young.

Too many young turkeys are overfed.

It is easier to overfeed than underfeed.

Scarcely enough attention is paid to providing grit for young turkeys to keep them in the best of health.

Have regular meals, and an hour after feeding remove all food uneaten.

Mrs. G. H. Watson, in Iowa Homestead, says: If a turkey is fed all the shelled corn he can possibly stuff himself with, he gets lazy and quarrelsome, crushing and tearing the life out of everything smaller and weaker than himself, that is not active enough to keep out of his way. Even the mother hen will kill the nearly grown youngster that she has fought so hard to protect and rear, if it goes sick or crippled.

The fact that turkeys are difficult to raise makes it all the more desirable that when brought to maturity they should be of the best, says the Gentleman Farmer. This can be assured by breeding and feeding, but never by the hit-and-miss methods in vogue by the ordinary breeder. Breed from the roundest birds; do not expect to get good market stock from long, lean progenitors. Gradually get your flock into square, merchantable shape, on which every ounce of fat will show to advantage, and make good eating.

Maryland and Philadelphia dry-picked turkeys, says the New York Produce Review, command the highest market prices, not only for the reason that the turkeys are fat and usually of a fine grade, but that they are well bled in killing, which naturally gives the skin a bleached white appearance.

E. P. Cloud, the editor of Poultry News, is an experienced turkey raiser. His method of fattening for market is as follows: "Do not confine the flock, to be fattened, in small pens; remember the nature of the birds require liberty; rather confine those which you wish to keep over. Turkeys having full liberty will devour much food and take on fat rapidly. Fattening turkeys will not wander so much, as after being put on full feed they will be more content to remain nearer home. Give the fattening turkeys all they can eat four times a day, from the time when you commence full feeding until twenty-four hours before slaughtering time. The first three of the daily meals should be of cooked potatoes and cornmeal, or of cornmeal scalded with milk or water, and the last of whole corn varied with wheat or buckwheat. Always use corn a year old; new corn causes much trouble and may kill them. Give the first meal as soon as possible after daylight, and the last just before dark. Feed each time all they will eat up clean, but leave no food for them. Feed the pounded charcoal occasionally, and keep a supply of gravel where they can help themselves."

Coop for young turkeys should have board floors.

A good sign is to see the young turkeys catching flies.

Grass and insects compose the natural diet of turkeys.

A writer in Poultry Farmer gives these valuable suggestions: Rearing turkeys requires a certain management and method of feeding. Very much depends on the feed for the first two months,

Unless they are at least a week old young turks should be kept away from all other poultry save their mother, since they are prone to follow anything that is moving. The first feed should consist of stale bread soaked in milk, with chopped onions and milk curd, to which should be added a little black pepper three times a week. Hard boiled eggs may be given, but there is a proneness to give too much of this food. A poult is easily killed and a few lice on it will mean its death.

Young turkeys require feed oftener than young chicks. The breeding stock should not be related in the least. Raw corn meal is not beneficial to turkeys. When they are old enough to eat corn they may eat almost any other feed that is at hand. A little fresh meat chopped and fed to them, will be a benefit and will also be very much relished. Keep roosting coops clean and dry. Should a mother hen refuse to go in a coop it is because it is full of lice or is filthy, her instinct telling her that it is not a proper place for her brood. Keep all drinking fountains clean and sweet. For the first few weeks the poults should not be exposed to rain or dew. Provide plenty of sharp sand or gravel for them. Give them a good dust bath, composed of sifted coal ashes. It will cause lice to hunt other quarters very soon. One very important point will be to look twice a week for large lice on their heads. Two or three healthy insects of this order will soon cause the death of a poult. Turkeys are fond of grass seed and insects, and will seek such foods if they do not have them. Turkeys do not take kindly to close confinement, and the young take great delight in warm weather, it can scarcely get too warm for them and for this reason the earliest broods do not do the best. Warm weather and long rambles through the fields are necessary privileges of the turkey. They will be noticed to move slowly scanning every nook and corner for some morsel to pick up, even in the heat of the day. To be profitable they should make rapid growth, and to do this they should have plenty of good food and should be kept warm and dry.

In an excellent article on the turkey, the Feather gives the following practical advice:

Marketing.

After the turkeys are grown and ready for market, quite as much care and attention should be given to the killing and shipping as to the proper growing. Where these things can not be done to good advantage, it is better to sell them alive. Buyers who are prepared to kill, dress, pack, and ship turkeys, and to save the feathers, should be in position to pay what they are worth alive; and should be able to handle them at a profit, better than can the grower, who may not be prepared to do the work to advantage. So much depends upon marketing them in the best condition that small growers should either dress and sell to their home market or, providing it can be done at a fair price, sell alive to someone who makes a business of handling such stock.

Killing.

Kill nothing but well-fattened stock. It seldoms pays to send ill-favored stock into market. Do not give any food to the turkeys for twenty-four hours prior to killing. This allows the crop and entrails to become empty and avoids much of the danger of spoiling. Full crops and entrails count against value; they often taint the meat and prevent its being kept for any length of time.

There are two methods of killing largely used. The most popular is to suspend the fowl by the shanks head down, and cut or stick it in the roof of the mouth with a knife made especially for this purpose. This severes the arteries and cuts into the brain, causing insensibility and a free flow of blood from the mouth. This is called sticking in the roof of the mouth.

The other plan is to break the neck by a quick twist or jerk backward. When the neck is completely disjointed the head is pulled away so as to form an open space in the neck in which the blood may settle. This plan has been but little used, though the claim is made that when so killed the fowls will keep longer, because there is no opening by which the air can get into the body, as there is when they are stuck in the roof of the mouth. This method has been more used for chickens than for turkeys, and to use it well requires considerable practice.

The method of beheading with an ax or hatchet has been employed for ages.

Dressing.

Dry-picking is always to be preferred when preparing the fowls for market. When in fine condition, nicely picked, and sent to market without having been packed in ice, a turkey is at its best, and consequently commands the highest price. As soon as the fowl is stuck and the blood is still flowing, pluck the feathers dry from its body, taking care in doing this not to break the skin or tear the flesh. Nothing detracts so much from dressed poultry as torn places upon the carcass or shank; picking must be clean and nicely done. When the fowl is plucked hang it head down in a cool place until all animal heat is gone from the body, being careful not to hang it where it will be so exposed to cold air as to be likely to freeze. Do not remove the head, feet, or entrails, but have the whole carcass, including head and feet, perfectly clean.

The method known as scalding and plucking is too familiar to need comment further than to say that care must be taken not to scald or tear the skin or shank. Perform this operation as neatly as possible. As soon as the animal heat has left the body, the appearance of the dressed turkeys may be improved by submerging for a short time in cold water, as this has a tendency to make them plump whether dry picked or scalded. The plucking should be done as quickly as possible; the more quickly done, the more readily can the feathers be removed.

Packing.

For shipping, pack as closely as possible into close boxes or barrels, nicely lined with white or manila paper; do not use brown, soiled, or printed paper. Have the package completely filled so as to prevent the poultry from shifting about in transit; do not use hay or straw for packing, as it marks or stains the fowls and detracts from their value. The above method can only be used when the poultry is sent to market without being packed in ice, and when this can be done with safety, either in refrigerator cars or for a short distance in cold weather, it is by far the best. The greater part, however, must be packed in ice. When necessary to do this, use nice clean barrels. Cover the bottom with broken ice; then put in a layer of poultry, then a layer of ice; continue thus till the barrel is packed solid and full. Head the barrel tightly and mark its contents plainly on the head, and never ship mixed lots of poultry in the same package if it can be avoided.

CHAPTER XI.

General Information About Geese—Breeding Season—Goslings: Care and Feeding—Fattening—Killing and Picking.

Green goose culture is a profitable industry, but not very extensively carried on compared to that of green ducks. Where sufficient space can be provided, it is a valuable adjunct to the poultry business.

Following are extracts taken from the writings of some of the best authorities, and in this we are under especial obligations to the Rhode Island Experiment Station, which made special trials and tests.

A goose was exhibited at the New Jersey State fair, 1859, and her history, on a placard posted on the coop, read as follows: "Madam Goose is now owned by Robert Schomp, of Reading, Hunterdon County, N. J. She has been in his possession 25 years, and was given to him by his grandfather, Major H. G. Schomp. Robert's father is now in his 85th year, and this goose was a gift to his mother as a part of her marriage outfit. The mate of Madam Goose was killed in the Revolutionary War, being rode over by a troop of cavalry. In the spring of 1857 she laid 6 eggs, three of which were hatched and the goslings raised. In 1858 she made 7 nests and laid but 2 eggs, evidence perhaps of failing faculties. Her eyes are becoming dim, one having almost entirely failed. The year of her birth cannot be known, but she remains a respresentative of the olden time."

William Rankin, about 25 years ago, purchased in Rhode Island a wild gander which had been owned by one family some 50 years. A member of the family had wounded the gander by firing into a flock of wild geese, breaking his wing. The gander recovered from his injury and was kept for that number of years, without, however, mating with other geese. He is now kept and used as a decoy bird during the gunning season, and highly valued by his owner, although at least 75 years old.

According to the Greensburg (Pa.) Tribune, at West Brownville, Mrs. Kate Krepps owned a goose that recently died at the advanced age of forty-two years. This was the last of a flock of geese which was owned years ago by Aunt Betsy Hopkins, mother of Mrs. Krepps, and it is said they supplied the feathers for all the beds and pillows in the old Hopkins house.

An instance is recorded where a Canada gander 45 years old was still serviceable, and in one season his progeny sold for the sum of $75.

Geese live to a great age, and females are reliable and productive breeders for many years, but ganders of the domestic varieties are usually unreliable after 7 to 9 years. Canada ganders can be profitably kept for 25 or more years.

Wm. Rankin, a veteran goose breeder, cites the instance of a goose owned in Boxford, Mass., where it was the property of one family for 101 years, and was then killed by the kick of a horse. She had laid 15 eggs and was sitting on them when a horse approached too near the nest; she rushed off, in defence of her eggs, seized the horse by the tail, and was killed by a kick from the animal.

Geese have a long tenure of life, far exceeding any other domestic animal in this respect. In former times it was not uncommon for the farmer's daughter, on her wedding day, to receive, among other gifts, a goose from the old homestead, to become her property and accompany her to her new home. In some instances such geese were kept for many years, perhaps far beyond the life of the young lady to whom it was presented.

The Hebrews of our large cities are the best customers.

The Hebrews use goose oil instead of lard.

The Philadelphia Times tells of a goose fattening establishment kept by Sol Renaker, Cynthiana, Ky., where 20,000 geese are annually fattened for sale to the New York Hebrew people.

Eating goose at Michaelmas was a very early custom in England for as far back as the 10th year of the reign of Edward IV. (1471,) John de la Haye was bound to render to William Barnaby, Lord of Lastress, in the country of Hereford, for a part of the demesne land, one goose fit for the Lord's dinner on the feast of St. Michael, the Archangel, says English Poultry.

Hungarians, Poles, Hollanders, Bavarians, Germans, Bohemians, etc., are especially fond of goose flesh, and prefer it to other kinds of meat for Christmas and holiday feasts.

The demand for geese is not constant, although there is a limited demand the year around; the greatest numbers are called for during the winter; especially at the holiday seasons. But to bring good prices they must be young, fat, well-dressed. and put up in attractive shape.

Large quantities of geese in the New York markets come from eastern Massachusetts and Rhode Island; a great many come, also, from Pennsylvania and Maryland, and perhaps from farther away. Great quantities of live geese are received from the west.

The American Agriculturist says: At Adamsville, R. I., there is a large goose-fattening establishment. The proprietors pick up the geese in carts when about half grown, that is, about the age that the quills begin to start; many farmers prefer to dispose of the geese in this way rather than have the trouble of fattening them themselves. The professional fatteners finish off the geese in 4 to 6 weeks. There is nothing secret about the method of fattening. They are given mostly cornmeal, bran and meat, and fed all they will eat. At killing time 5 or 6 pickers are employed, and these become very

expert. dressing off from 20 to 25 a day. The product is shipped to New York and Boston; sometimes the demand is better in one city and sometimes in the other. The poultry are dry picked, and feathers sold being kept until winter and shipped all together. Goose feathers are usually worth about 35 cents per pound. Mr. Cornell, owner of this establishment, said that last year he fatted about 10,000 geese and about 4,000 ducks, not so many as usual, as it was a poor season. He feeds 100 bushels meal per day, and two tons meat scraps per week. He does not coop them in houses to fatten, but lets them out in yards about 30 to 40 feet square. He employs 8 pickers and 3 or 4 men to take care of the geese. He pays 10 cents for picking.

Green geese are also called Boston geese, says Rural New-Yorker, not because they all come from that city, but because they resemble in style of carcass and dressing the geese from that locality, that established a reputation years ago.

The Boston geese are usually dressed with the tail and wing feathers left on, and a ruff around the neck.

An abdominal pouch of great size indicates great age. This sign is useful in purchasing breeding birds.

P. H. Wilbur gives the average product per goose for 8 years, on his farm, at $7.48.

The Canada goose, mated with the domestic goose, produces goslings commonly called mongrels, and sometimes termed "mules," because of the fact that they are sterile.

It is occasionally true that a mongrel goose when kept for two or more years will lay a few eggs, but we have no knowledge that goslings have ever been hatched from eggs laid by a mongrel goose.

Geese only one year old are not mature as breeders. The females lay a less number of eggs, of smaller size, and a greater proportion is usually infertile than is generally the case with females two or three years old.

Ganders and geese are much attached to their mates and seldom prove unfaithful. Mismating and remating are often unsuccessful unless old mates are separated beyond sight and hearing of each other.

Under natural conditions, geese copulate while in water, and when Canada geese are kept for the production of mongrels, water for swimming purposes is considered necessary, in order that fertile eggs may be produced.

According to the Rhode Island census for 1895, each breeding goose (male or female) produced in goslings and feathers an average return of $6.76, which represents 371.42 per cent. upon the value of the breeding stock.

Two common varieties of domestic geese, Embden and Toulouse, are without doubt descended from the wild "Graylag goose," (Anser Ferus) of England and the Continent. Two other breeds, Brown China and White China, are derived from an Asiatic species known as the Anser cygnoides, and it is quite possible that the African goose may have descended from the same original type.

The date of the domestication of the goose is hidden in the dimness of prehistoric times. Ancient writings reveal the goose as one of man's domestic animals valued for the flesh and feathers supplied by it for his food and comfort. Since the fourth century, quills from its powerful wings have furnished instruments for writings, valuable and indispensible, until in modern times supplanted by their imitation, the steel pen.

Geese have a strong attachment to the place or locality constituting their home, and removal just prior to or during the breeding season usually has a very injurious effect upon the egg yield and the fertility of the eggs.

According to the Rhode Island census for 1885, the average product per sheep in wool and lambs was $2.51, while the same year the average product per goose was $2.72, or 21 cents more for each breeding goose kept than for each breeding sheep.

By mating Embden ganders with African, Toulouse or Brown China geese, hardy, vigorous, quick-growing goslings are secured, having all the good points of the dark breeds, combined in a large majority of cases with white or pied plumage, and a yellow bill; birds which dress easily and command the highest price in the market.

The goose is naturally a grazing animal. The bill is provided with sharp, interlocking, serrated edges, designed to easily cut and divide vegetable tissues, and the tongue at the tip is covered with hard, hair-like projections pointing towards the throat, which serve to quickly and surely convey the bits of grass and leaves into the throat.

Geese are naturally timid, watchful and easily frightened, but the ganders, during the breeding season, and in defence of their young are bold and courageous to a remarkable degree. They have many peculiarities which the breeder who would be successful should carefully study. They should be gently and kindly treated at all times.

Picking live geese is now seldom practiced by goose breeders in Rhode Island.

Domestic geese in general are polygamous to the extent of mating with two to four females.

In cold climates shelter during severe weather should be provided, to guard against frozen feet.

A quiet, docile goose does better than a shy one.

The New York market depends more or less upon New England for her supply of green geese in the Summer.

A gander and a couple of geese are sufficient to start with, for their eggs, as a rule, are very fertile, and they are excellent sitters.

Geese will come nearer living on pasturage and taking care of themselves than any other class of poultry.

Goslings come in for the table as "green geese" in the Summer, and should be fine birds for the Michaelmas board.

Rhode Island breeders have the reputation of producing the largest and best specimens of green geese. They are willing to take

the necessary pains, and perform the necessary labor to give their goslings the necessary conditions; and without these three necessary things it is vain to expect success, for it will never come.

Geese do not require a high or tight fence.

It costs about $1.00 a year to properly keep a goose.

Dora Stephenson, in Wisconsin Farmer, says one reason why geese are not used more in this country is because so many do not know how to dress and clean them. She has often heard the remark that a goose is not fit to eat, but a young goose properly cooked is a dish fit for a king. To clean take a common wash boiler, putting two bricks in each end, and pour in a gallon of water. Make a frame of lath to fit on top of the bricks, then when the center is boiling lay your goose on the frame and put on the lid to the boiler. Steam it for about three minutes, or till the feathers come out, turning the goose when it has been in the boiler about two minutes. The feathers must pull easy as they do when a chicken is scalded. Now get a thin sack of any kind and pick your feathers into it and hang them up to dry, when they will be fit to use the same as dry picked ones. To roast prepare the same as any other fowl. One of the patent roasting pans is best. When your goose has been roasting about two and one-half or three hours, take the pan out and skim of all the fat that is melted. If the goose is yonng it should be tender in four hours. The goose must be fat to be good. Miss Stephenson says she steamed over a hundred last Winter and sent them to the Chicago market, saving all the feathers.

A low, marshy field with a little upland does splendid for geese.

There is no chance for loss in goose culture if properly managed.

Geese for Christmas should be on the market by December 20th.

In the Eastern markets green geese generally command broiler prices.

Goose oil has served as a panacea for rheumatism, lumbago, stiff joints, sprains, etc., from time immemorial.

An exchange says that while geese are a water fowl, by giving them plenty of fresh water to drink and keeping them away from the barnyard and stagnant water that accumulates there, geese can be raised with equally as good results as if raised on the banks of a stream.

Among our most valuable breeds of geese, the Embden is one of the best, says Ohio Poultry Journal. The rivalry between it and the Toulouse has been sharp in past years, but the Embden seems the choice of late years, owing to its pure white plumage and ability to put on flesh rapidly.

The Embdens excel in the value of their feather crop.

Never pick geese when they will be exposed to cold weather.

It will require about four geese to make a pound of feathers.

The time to pick is when the quill of the feather is ripe or clear.

Pick the geese in a closed room, as the least wind will scatter the down and feathers.

After being picked, it will take six weeks for the geese to grow and ripen a new crop of feathers.

A pair of Toulouse geese, says the Fanciers' Review, will turn off about two dollars worth of feathers in a year.

While the feathers are developing, the quill is filled with bloody matter, which is an evidence that it is not ripe.

The Fanciers' Review gives this method for picking live geese: Having taken up your bird, draw a long bag or stocking over its head and down on its neck, as it will prevent it wreaking its vengeance on you by its merciless biting. The wings are also formidable weapons and must be held or their blows will leave many black and blue marks as evidence of their power. When picking, take all the small feathers, leaving the large ones, except four or five under each wing, which prevents them from drooping; take off all the down only in warm weather.

White goose feathers are more valuable than colored ones.

Some geese raisers pluck their birds every four or six weeks.

In Strasburg, a place celebrated for its pies, the geese have a shepherd to tend them as sheep have.

According to an experiment tried in Rhode Island, fall-sown rye, spring sown oats and peas, and sweet corn, will furnish pasture sufficient for two hundred geese per acre.

Matthieu, the cook of Cardinal de Rohan, was the first who suggested the use of the liver of the goose for pies.

In Europe the liver of the goose is much esteemed, which is sold to pie makers who make of it the well known pies.

Goose livers in Europe command as high as $4 per dozen.

Newman thinks there is money in raising goose livers for the New York markets.

Hanover Ganze Biuste (Hanover smoked geese breasts) sell in Europe in the finest delicatessan stores at 80 cents to $1 a pound.

Vegetables and cut clover hay should be in the bill of fare.

Geese are profitable layers up until 12 years of age.

Feeding too much corn in winter unfits the birds for breeding.

Too much grain induces too early laying, causing infertility of eggs.

The gander don't have a curled feather in the tail, as does the drake.

The first green goose in the New York and Boston markets bring from 18 to 25 cents a pound.

Mr. Newman says it is a wrong belief that geese or their droppings will kill grass or destroy a pasture. If you have a large flock of geese and a small pasture, they will clean it up. That is, they will eat the grass as fast as it sprouts, and give it no chance to grow, just as a cow on a city lot will soon have only bare ground, and you have to tie her out in the road. If you could do the same with geese, you would find the grass coming again and growing as before.

Writing in the Country Gentleman, Prof. Samuel Cushman says: It is useless to attempt to raise geese successfully if they are

afraid of the attendant. They should be treated with kindness and have full confidence in their keeper. A nervous, quick tempered, excitable, rough person may keep them so disturbed that they cannot thrive.

Chas. F. Newman, in Reliable Poultry Journal, say the Toulouse goose is the most profitable goose to raise. It grows the largest, matures the quickest, is not so much a rambler and flyer as other kinds, and as it does not take so readily to water as other varieties, it grows more rapidly, and accumulates fat faster. Neither are they so noisy.

When six or seven months old, or at maturity, says Mr. Newman, you can usually, by observation, tell the ganders from the geese. The male, in most cases, grows some larger than the female. The goose is deeper in the body, a trifle slimmer in neck, and smaller in head. The call of the gander is loud, long and shrill, while that of the goose is merely an answer to it.

Ten geese will consume as much grass as a cow.

Geese seek mates in February.

The gander is a gallant protector.

It is hard to glut the goose market.

Geese, like turkeys, cannot be yarded.

The Jews buy only live geese.

The average weight of goose eggs is about 5 1-2 ounces each.

A goose is said to be the cleanest fowl alive.

A goose is particular about the condition of her food.

Geese have a great deal more sense than they are given credit for, and they learn to know their attendants and seem to appreciate the care and attention they receive.

A gosling at three months of age should dress 10 to 12 lbs., depending on the season of the year hatched, the breed, etc.

The Journal of Agriculture says inbreeding is the greatest evil to be guarded against. Unless new blood is introduced into the flock once in every five years at least, the geese are sure to deteriorate to a serious degree. If the flock is well kept up, however, geese can readily be produced that will weigh from 12 to 18 lbs. a piece dressed.

Howard says the Toulouse is called a Christmas goose, as it matures just about right for the holidays.

The Africans, Toulouse and Brown Chinas have black pin feathers, which make them difficult to pick when dressed as green geese.

In cider making time a few bushels of seedling apples, that will keep well, should be laid by in the cellar for the geese, says, American Fancier. It is worth all the trouble just to see the evident enjoyment with which they eat them, to say nothing of the promotion of their thrift.

Ordinarily, not over two or three per cent of goslings should die after the second or third day, says Prof. Cushman. "Most experienced goose raisers say they are about as sure to raise goslings as colts, accidents excepted."

Goose dung brings a high price as a fertilizer in China.

Ganders occasionally take very peculiar freaks, such as conceiving a violent attachment for some inanimate object, as a door, stone, a cart wheel, a plow, or something of a similar nature, when they will spend the greater part of their time sitting beside it or in its company.

While the young gander often mates with 3 or 4 females, he usually has one particular favorite among the number, whose nest he guards more jealously than those of his other mates, and after some years he is liable to grow so inattentive to all but the favorite that many of the eggs produced prove to be infertile, and it is more economical to replace him with a younger bird.

Geese are less liable to disease than any other domestic fowl, which, possibly, may count in some measure for their generally long life.

Toulouse geese usually lay more eggs in a season than Embden or African geese, but not as many as the best China geese.

There is a curious plan to determine sex adopted in Cambridgeshire. All the geese are shut in a stable or a pig stye; a small dog is then put in. It is said, and we believe with truth, the geese will all lift up their heads and go to the back of the place, while the ganders will lower and stretch out their necks, hissing all the time.

Morris relates a number of instances where ganders have become the inseperable companions of their masters, following them about the fields, on hunting expeditions, and into the streets of a town, like the most devoted dog. He also narrates how faithfully a gander discharged the self imposed duty of guardian and guide to an old blind woman. Whenever she went to church he directed her footsteps into safe paths by taking hold of her gown with his bill, and during the service he nipped the grass in the cemetery close by, until she required his services as guide to return home.

Ganders fight among themselves whenever one colony intrudes upon the territory of another, and their battles are severely fought, usually with the wings, one gander seizing the other by the first joint of the wing with the bill, and beating him with his wings while thus held.

Unlike gallinaceous fowls, the goose has practically no crop, although an enlargement of the end of the gullet next the gizzard in some measure serves to hold food, consequently it feeds at very frequent intervals, and during warm weather often eats more at night than during the day time, a point which should be remembered in feeding and caring for them.

If, for any reason, the gander is separated from his mates and placed with others, he will seldom accept them so long as his old mates are anywhere within hearing distance, and, even when they are entirely removed from the premises, it frequntly takes some time before he will become reconciled to his new mates.

Geese become attached to the locality in which they are kept, and are much disturbed when removed to a new location; hence,

when such removal is necessary, or when a beginning is to be made in the keeping of geese, breeding birds should be placed in their new quarters some weeks before the laying season begins, or a good number of fertile eggs will probably not be obtained.

Old geese, changed from their home surroundings to a new locality, will seldom do as well the first season as afterwards, unless, perhaps, the change has been made in the summer, after the close of the breeding season.

By arranging with some goose breeder at the early part of the season—May or June—breeding stock can be selected from the number raised during the season, and in that way better birds obtained than later in the season.

If the young geese can be brought to their new home in the autumn they will become well accustomed to their surroundings and feel at home before spring, and there will usually be no difficulty in mating.

A piece of low swamp ground in which pond holes exist, or may be artificially made, is an excellent place for geese, and when a piece of dry upland can be also utilized for the same flock, it makes an ideal location.

In purchasing geese in the market, the Jews, for some reason, always look for a bird with a yellow or orange bill, and a large wholesale poultry breeder states that it is almost impossible to sell a Jew a black-billed goose so long as he can find one having a light colored bill.

In handling a goose, it should always be taken by the neck, and when lifted from the ground the body should be turned with the back toward the person handling it. In that position it cannot strike, and will remain quiet and docile. The body can be partly supported by seizing the first joint of the wing with one hand. If the goose is held facing one, it will strike hard blows with its wings or scratch with its feet.

Breeding Season.

It takes 30 days to hatch the goose egg.

A goose covers her eggs with the nest material.

Geese seldom become broody the first year.

A goose should average 20 goslings in a year.

Geese begin laying late in January, or early in February.

Geese cannot be profitably hatched and reared artificially.

Some breeders wash the eggs if covered with mud, while others do not.

A good sized hen will cover five eggs, a goose from 9 to 13 eggs.

The goose will lay from 10 to 15 eggs and then sit diligently on them and seldom fails to bring off a good brood.

A writer in an exchange places the cost from hatching to time of maturity, at from 50 cents to 75 cents per head.

Goslings well hatched are seldom lost. except through accident or exposure to hard storms while still very young.

Any changes in the mating of geese should be made in the fall, or certainly before January, if the best results are expected.

Two or three litters of eggs may be secured by "breaking up" the goose by shutting her in a pen for a few days when broody, and setting the eggs under hens.

A writer in American Stock Keeper says that after the 28th day of incubation, goose eggs should be put in milk warm water a few moments each day.

The shells of the eggs being tough, it is necessary to sprinkle them every now and then during the hatch, with luke-warm water.

The eggs should be gathered as soon after they are laid as possible, to avoid their being chilled.

A goose is usually given 11 eggs for a sitting, although a very large one might cover thirteen.

The fertile eggs usually hatch at the end of 28 or 30 days, but a longer time is occasionally required.

When each goose has her own nest she can easily be set at the end of the second or third litter as desired.

After the eggs have been incubated for about 7 to 10 days they can be tested, and the infertile ones taken out.

The eggs should be kept in a moderately warm place, not too dry, and should be turned over every day until set.

Children should never be allowed to approach geese during incubation, as they are capable of inflicting serious injury.

If the nests of the geese are properly provided with straw, the eggs will never be sufficiently soiled to require washing.

Five to seven eggs, according to the size of the hen, are enough, as they require considerable heat, and should be well covered.

Hens are generally used to hatch the first eggs, and for this purpose quite large hens, as Brahmas or Cochins, are generally preferred.

The early-hatched goslings must be kept from severe cold at first. As they come out they should be brought into a warm room and wrapped in flannel until all are hatched, says Farm Journal. The best time to take the young out of their wraps and put them with the hen is in the evening.

"Great laying in geese is not to my mind any recommendation," says an old breeder, in American Stock-Keeper. "I prefer a goose that will lay a good sitting—say from 12 to 15 eggs—and then sit down and hatch them and bring off her flocks to the fields as soon as they can be trusted to ramble far from home."

Whether your goose eggs are set under hens or turkeys, they should be sprinkled during the incubating period, says, Prof. Cushman, in Country Gentleman. In this section it is done twice per week after the fifteenth day, and more freely just before the twenty-eighth day, when they commence to hatch.

The broody goose plucks off more or less down from her breast with which to line the nest and cover the eggs whenever she leaves them.

Usually the vitality is somewhat affected by keeping eggs too long, and the goslings are not so strong and active as when hatched from fresh-laid eggs.

A basement, or a fairly close building, where a reasonably mild and uniform temperature can be maintained, makes an excellent place for setting hens on goose eggs.

The shells and lining membranes of goose eggs are thicker and tougher than those of hens' eggs, and care has to be exercised that they do not become too dry.

The ganders should be left with the geese during incubation.

It is well to place food and water near the nest of the sitting goose at hatching time, so that she will be less likely to leave the nest before all the goslings are hatched.

Eggs under a goose seldom need attention, as more or less moisture is brought to the nest when the goose bathes, as she will at intervals, if allowed the opportunity.

Many breeders sprinkle the eggs and nest during the last two weeks of incubation, and still others dip the eggs into water instead of sprinkling them. Some use lukewarm water, others use cold water.

It is better that one person should care for the geese regularly, and he should be quiet and gentle in his movements, so as to gain the confidence of the flock and make them as tame as possible. The advantage of this will be evident when the geese wish to sit during incubation, and while the goslings are small.

After the goose has been a day or two on the nest, and it is desired to break her up from broodiness, she can be taken off and put in a coop, which should be large enough so that she can stand erect. If she is confined here, at a little distance from her mates, she will usually abandon the idea of sitting after 5 or 7 days, and when released will shortly begin laying again.

Ganders, during the breeding season, and even the geese when sitting, or in defence of their young, manifest considerable courage and often punish intruders severely. When interfered with they seize the intruder with the bill, strike with the wings, and sometimes scratch with the claws. They have sufficient power in the jaws to bite quite hard, and a large, full grown gander has been known to strike hard enough with the wings to break a person's arm.

In setting a chicken-hen with goose eggs, Mr. Newman says, the hen will set all right, but when the young ones break the shell, and the hen sees a green little creature with a long, wide bill saluting her, she takes it for a freak or nature and off comes its head! Not many hens will claim the young geese, so take the goslings away as they hatch and try the hens, giving them to a good slow, gentle mother. As soon as she takes them without any fuss there is no further danger.

Goslings: Care and Feeding.

Do not overfeed the young.

Goslings should be protected from storms or from sudden showers.

Northern flint corn, finely cracked, is preferred by some feeders of goslings.

Wire netting, one foot wide and one inch mesh, makes a good fence for goslings.

After four or five weeks old, feeding at morning and at night will prove sufficient.

Care should be taken not to overcrowd, as the young are liable to injure or even kill one another.

Some breeders use a few sweet beef scraps in the food when young are four or five weeks old.

The young should be confined at night where they are safe from the attack of rats, weasles or minks.

Grass is the natural food for goslings, and where the supply is abundant less grain fod is required.

If hatched before the grass starts in the spring, the care of the goslings is rather a difficult matter.

The goose will take excellent care of her young brood, and need not be disturbed until time to feed them.

When goslings are hatched in incubators, they can be readily cared for by using some good artificial brooder.

Sharp sand, saturated with water, should be provided in a shallow dish where the young can help themselves at any time.

The bottom of the brooder should be covered with fine sand, which should be changed so that it may be dry and clean.

The very early goslings are more valuable than those later hatched, because they mature earlier and are the first to be ready for market.

As soon as the quill feathers have developed upon their backs, goslings will be out of danger from injury through getting wet in showers or storms.

At the end of two or three weeks, and much less time than that after June 1st, the brooder can be dispensed with altogether, in using artificial methods.

In extremely hot weather, or in the bright sunshine, goslings are liable to become sunstruck, and should be provided with shade from the heat of the sun.

Goslings require to be kept indoors, and on an earth floor, if possible, and should be provided with some kind of green food, as chopped lettuce or cabbage.

As the weather becomes warm, the goslings can be allowed free access to water, in which they can swim if they choose, without danger of getting chilled.

While small, the young should be fed 4 or 5 times a day, and when 10 days' old a little food may be put into the building when they are shut up for the night.

When the flight feathers of the wings have grown sufficiently

to reach nearly to the tail, the goslings are ready to sell to the fattener or to be penned up for fattening.

When goslings are with a hen they should be given the same opportunity to feed upon tender grass, which promotes their growth more rapidly than anything else.

It is best to give a fresh supply of bedding every day, as it soon becomes soiled and wet, and young goslings are liable to contract rheumatism from sleeping upon it.

The Western Rural says that eggs fed to goslings should not be boiled too hard; just so the yolk is sticky.

Mr. Brabazon says if you want to teach a gosling to eat, you must do so by throwing the food in water.

At 10 weeks' of age, or when the tips of the wings reach the tail, young geese are ready for market and should weigh between 8 and 9 pounds.

Goslings make the greater part of their growth upon grasses or fodder plants, and can thus be more economically produced than poultry which requires to be almost exclusively grain fed.

J. R. Brabazon, of Delavan, Wis., says goslings will not eat for the first three or four days. Then he gives them tender young lettuce or grass sprinkled in water.

A New Jersey raiser feeds his young goslings johnny cake the first two weeks. After that he feeds scalded shorts, bran and corn meal, to which is added a liberal amount of ground beef scraps.

In hatching goslings artificially, the first day or two the incubator should have a temperature of 90 to 93, which may soon drop to 80 to 85, according to the weather conditions.

The building in which the young are confined should be provided with a sufficient supply of cut straw or hay to cover the floor, and this should be frequently changed.

When hatched they do not require feeding until they are 24 or 36 hours old. Oats may be sown in shallow boxes of earth, and their tender blades make a good substitute for grass.

One point should be remembered—the water dish should never be allowed to become empty for any length of time, whether while the goslings are small or at any time during their life.

Goslings, while small, are covered with down, which seems to have little power to shed water, and soon becomes wet, and the goslings become chilled and soon die, unless thoroughly dried and warmed.

If the supply of grass or green food is scanty, the goslings should be fed more frequently and a larger quantity, as goslings, to be profitable must be kept growing from the time they are hatched until sold.

If the weather is pleasant the young should be given every opportunity to feed upon short, tender grass, and, if kept indoors by severe storms, a few sods or bunches of short grass will be greedily accepted.

As a rule, goose breeders calculate to have the first goslings hatched about the time the grass begins to grow in the spring and

the weather becomes sufficiently mild to allow the young goslings to be put out of doors.

Goslings with a goose may be confined by three boards, 10x12 feet in length, and a foot wide, set upon edge, making a triangular pen. This pen can be moved as frequently as the goslings eat up the grass and require a new pasture.

A good feed for young goslings is scalded, finely cracked Indian corn, with a little sweet Indian meal or bran mixed with it. It should not be wet and sticky, but just enough water should be added to make the dough have a crumbly consistency.

The old goose will seldom cause any trouble by deserting her goslings. She should be placed a little distance from other geese, and especially her mates, or they may cause trouble by jumping into the pen with her, to the great danger of the goslings.

After the goslings are 10 days' old, the goose and her flock can be allowed to roam at will in a pasture with short grass, although it is better that the goslings do not have an opportunity to swim, as they are liable to become chilled by the cold water.

Water should be provided the young gosling in a shallow dish, in which a few pebbles or bits of coal have been placed, or some other provision made to prevent the young goslings from getting into the water, and getting the soft down, with which they are covered, wet, thereby becoming chilled.

Some hens become restless on the nest, and are liable to kill the young goslings by treading upon them. In such cases it is well to give the goslings to a more quiet hen, or perhaps remove them to a well-lined basket or box by the kitchen fire, where they can remain during the day, to be returned to the hen at night.

Goslings occasionally get "cast." That is, they fall upon their backs by accident, and are unable to get up. A goose at such a time has sufficient instinct to turn the goslings over with her bill, but the hen fails to comprehend the necessity of this, and it is always well for the attendant to count his goslings at every feeding time, when, if one is missing, it may, perhaps, be found alive, and returned to the flock.

It will sometimes happen that you will hatch and raise a gosling with a broken wing. It is no serious fault at all, only a misformation in the egg. Mr. Newman says if it is a nice, large, promising bird do not kill it, nor be apprehensive that it will breed broken winged birds, for it will not. If the looks of it be unpleasant to you, take a sharp knife and sever the crooked part at the joint. Bandage it and it will soon heal, and you will never note the difference afterwards. You will generally find such to be the largest birds.

Fattening.

In Europe finely ground oats or barley mixed with milk is used for fattening.

When the weather is warm, goslings eat less, and consequently fatten more slowly.

Geese for fattening should be penned upon high, gravelly soil, or land that will not become muddy in wet weather.

In fattening goslings during the warm weather of summer, provisions should be made for as much air as possible.

A pen for fattening 50 geese should be 40 feet or more square, and should be bare of green crops and provided with shelter from the sun.

Goslings, while being fattened, should be kept as quiet as possible. They should not be disturbed by the presence of strangers or dogs.

Decayed stumps, or pieces of partially rotted wood, are greedily eaten by geese when fattening, and a moderate supply seems to do them good.

White flint corn or white cornmeal is prized by some who believe that it produces a whiter flesh or fat which gives the bird a more desirable appearance.

No shelter from rain is required in the fattening pen during the summer or fall weather, and geese are almost never fattened for market during the winter.

It is better to have two pails, each half full of water, in the fattening pen than one filled to the top. Goslings can then only get water for drinking which is all that is desired.

A quick way to fatten geese is to put a few in a darkened pen and feed a pound of oats per day to each one. They fatten in two weeks.

The fattening of green geese should begin when the flight feathers of the wing have grown sufficiently to reach the tail.

It is difficult to fatten mongrels properly until the cool weather of Fall when they fatten readily, about the same course being pursued as in the fattening of other goslings.

Goslings hatched in July and kept until January or February, and then fattened and put on the market, will be classed by the dealers as old geese, and bring a very inferior price.

Several hundreds may be fattened in a pen together, provided it is sufficiently large for them, and that proper care is exercised in distributing the food and water so that all can share alike.

Geese intended for market are usually fattened and killed not later than the middle of November, at which time the dealers put large quantities in cold storage for the winter and spring trade.

Care should be taken that the scalded food is always sweet, and does not stand long enough to become sour and unwholesome. It should be scalded just long enough before wanted for feeding to become entirely cooled.

One large dealer writes that when real cold weather arrives the flesh and muscles of both sexes rapidly harden and become tough, so that, when kept into the winter and then killed, they do not give satisfaction to the consumer.

When penned for fattening, goslings may be fed for one or two days quite moderately, in a way to prepare them for the regular fattening ration. During this time they can have a little green food, and such grain food as they have been accustomed to.

Since the almost universal use of cold storage, some dealers are having even their mongrel geese for the Christmas trade fattened

and killed at Thanksgiving and kept a month in cold storage, instead of having them killed at Christmas as was formerly their custom.

Any goslings which are not fat when taken from the fattening pen are usually allowed to run outside for a week or two, where they have plenty of green food and only a moderate amount of grain, and are afterwards put in the fattening process a second time.

The cornmeal and the beef used in fattening food should be of the very best quality, and mixed in the proportion of one part of scraps to four parts of meal, by measure, and a little salt should be added, just enough to season it, care being taken not to use too much.

Some fatteners, about two hours before killing the birds, allow them to eat what they will readily consume of sweet, fresh, green food, like green oats or sweet corn. They claim that this fills the birds up, and they present a more plump appearance and sell better in the market.

It requires usually from 17 to 20 days' steady feeding to fatten goslings. If fed much longer than that their appetites are likely to fail, and they are also inclined to molt, which of course seriously interferes with fattening, and would also make the bird hard to pick and unsatisfactory when dressed.

Some kinds of geese are more nervous when confined in the fattening pens than others, and at times a flock will get in the habit of running from side to side of the pen, or "churning," as the fatteners term it, when the least unusual thing occurs. Under such circumstances they fatten very indifferently.

Goslings should be slaughtered when taken from the fattening pen or soon afterward. They should never be shipped or carted away from the place alive. If this is done and they are then dressed, the fat will have a dark appearance, as though the birds were not in a good, healthy condition, and they will hardly be saleable.

For fattening, feed scalded dough, made from Indian cornmeal and sweet beef scraps. Water should be provided in pails or buckets, giving them a fresh supply three times daily, but only sufficient for them to drink, and not enough for them to attempt to bathe, as water spilled around the pen is apt to make the ground muddy, and any unnecessary exercise is hindrance to fattening.

Feed in the morning what dough the goslings will not eat up in an hour after feeding. At noon feed whole corn in the same way, but at night a considerable larger quantity of dough can be given them, as they will eat more sometimes during the night, when the weather is cooler, than during the whole day. A little powdered charcoal should be mixed with the dough about twice a week. If at any time more dough should be given than is eaten up, remove it from the pen before giving them a fresh supply.

The following method in fattening is adopted by an English goose farmer: Geese in good condition should be shut up in a quiet place, shaded from the light, where they cannot see other geese at liberty, and should be kept there from 20 to 25 days. It is beneficial

to let them out for about 15 to 30 minutes first thing in the morning and again in the evening before dusk. The meals they get should be nutritious, and a mixture of barley-meal, wheatmeal, a little cornmeal and boiled potatoes given warm twice a day is good. About the last ten or twelve days it is advisable to mix a little finely chopped rough fat with the meal. This has the effect of plumping them up, rendering their flesh much more palatable. A trough of clean water should be supplied to the birds after the evening meal.

Killing and Picking.

Green goslings are never drawn for market.

In picking mongrel geese, the tail feathers should be left on the bird.

Professional pickers usually receive 10 cents each for picking green geese.

Young geese should be well fed the night before they are to be killed for market.

Care should be taken not to tear the flesh, as the skin of some goslings is very tender.

Some fatteners feed freely of some sweet green food, like oats or sweet corn, about 2 or 3 hours before killing.

Appearance has much to do with the selling value of geese, as well as of any product put upon the market.

The feathers from 45 green geese, dressed August 29th, weighed 12¾ pounds after steaming and drying.

Expert pickers can dress from 20 to 30 birds in a day, depending, of course, upon whether they are hard or easy to pick.

When large numbers of green goslings are dressed, the feathers form no inconsiderable part of the income from fattening.

Removing the pin feathers one by one is, of course, a slow process, but it has to be done that the birds may present a good appearance.

In picking, only the salable feathers are put into the box, the wing and tail feathers and soft pin feathers being thrown upon the floor.

Before packing, the goslings should be removed from the barrels of ice water and laid upon boards or benches to allow the water to drain from them.

The feathers from a mature gosling will weigh about one-fourth to one-third of a pound, but green goslings, if quite young, do not yield as many feathers.

The room to be used for dressing geese should be provided with a box to receive the feathers, at which two pickers can conveniently sit, one on each side.

For killing, a stout knife with a double-edged blade about 4 inches long, tapering to a point something the shape of a dagger blade is commonly used.

A common shoe-knife is most convenient for removing pin feathers, and should be kept very sharp, as a razor edge is necessary to do quick and satisfactory work.

Birds with dark feathers, particularly of Brown China, and

sometimes of African blood, pick harder and tear more easily than Embden or other white-feathered varieties.

The feathers should be picked from the lower third of the neck, leaving about two-thirds of the length of the neck next to the head unpicked. The wing feathers beyond the first joint are also left.

The wings are pressed slightly toward the back in tying, and their natural elasticity forces the breast meat and fat upwards so that the bird looks plump, if well dressed and the cord is tight.

Goslings are shipped to market by packing in boxes or barrels with broken ice. The quantity of ice used depends upon the temperature of weather at the time and the distance to which they have to be shipped.

In warm weather, when green goslings are usually dressed, they are kept in barrels of ice and water until sent to market. The birds should be freshly packed in ice and clean water as soon as the bodily heat is thoroughly taken out of them.

Sugar barrels are often used for shipping. One or two holes should be bored in the bottom to allow surplus water to drain away. A good layer of ice should be used at the top of the barrel, which can then be covered with two or three thicknesses of burlap.

Scalding is seldom practiced where birds are to be shipped and kept for some time before being sold; but where birds are slaughtered for immediate sale in a nearby market, the picking is made very easy by scalding. The feathers, however, are of no value.

In packing the head of the gosling is placed against the side of the bird, which is then packed back downward on a layer of cracked ice in the box or barrel. After enough have been packed to make a layer, cracked ice is put in and another layer placed upon them until the package is full.

The shrinkage in dressing goslings is comparatively small, as only the blood and feathers are lost. It occasionally happens that a specimen will absorb sufficient ice water so that the dressed weight will equal the live weight of the bird. As a rule, however, the shrinkage is about 5 per cent. of the live weight.

Where ducks and geese are sent to markets requiring them drawn, they may be scalded; then wrap them in a cloth for two minutes, when the feathers and down will come off clean.

It is said that it is much harder to dress a gosling in cold weather. The feathers set tighter, and in picking them the flesh is torn.

Farm and Home says those intending shipping should send to dealers in poultry for modes of preparing for market, since modes differ in different sections.

In dressing Canada geese for market, the feathers of the head, two-thirds or more of the neck, the wings and tail are left on the bird, and serve to identify and guarantee the genuineness of its breeding.

The feathers should be spread in some clean, dry, airy place to cure. If placed upon the floor of a loft they should be turned over with a fork every few days until thoroughly dried. If put in bags and well steamed they are more valuable, as the steam in a measure

purifies them and removes somewhat of the oily odor which they otherwise have.

When many pin feathers are found on the birds, they have to be removed with a sharp knife. White pin feathers can be shaved off, as the part remaining in the skin will not show, but black pin feathers must be removed entirely. The operator takes the skin of the bird between the fingers of the left hand and makes a slight longtitudinal cut in the skin on the side of the pin feather, when it can be easily removed.

As soon as the bird is picked the blood is rinsed from the head and mouth, the bird is placed upon its back, and a string tied tightly around the middle of the body, pressing the wings firmly against the sides. Fairly stout, white cotton twine is generally used for this purpose, but mongrel geese, for the Christmas trade are sometimes tied with a narrow colored tape, or braid, which adds somewhat to the appearance of birds designed for a fancy trade.

Some fatteners break down the breast bone before tying. To do this the bird is laid on its back on a solid bench, the breast is covered with several thicknesses of damp cloth, and two or three blows on the breast-bone given with a wooden paddle made from a piece of smooth oak board, about an inch thick and perhaps six inches wide. Just enough force should be used to crush down the rib bones, so as to settle the breast bone down somewhat, the object being to give the breast a plump, meaty appearance. After the wings are closely tied against the body, and the blood has been rinsed from the head, the bird is immersed in ice water, barrels usually being provided for this purpose.

Where birds are scalded all the feathers are removed, including those on the neck and wings left on when the bird is dry picked. This allows the housewife to use the whole neck and wings in cooking, so that the shrinkage in drawing would be a little less from this method of picking than from dry picking.

Josephine Morse, in Poultry Topics, gives this method of killing and picking geese; hang the goose up by the feet where it cannot bruise itself. Stick a narrow-bladed sharp knife through the neck close to head. Be sure to sever the veins, but make as small a wound as possible. Let the goose hang till dead. Have a boiler little more than half full of boiling water; throw in one pail full of cold water; take the goose in one hand, dip in the water three times and then wrap in an old bag or carpet to steam a few minutes. Then with the thumb and fingers remove the feathers and down at once by deginning at the head. Finish by singing with a blaze made with shavings, as there will be less smoke. Then wash in rather warm soap suds and dip in cold water. A small vegetable brush is nice for the purpose.

Practically, all the geese sold in Boston and New York markets are dry picked, but for some markets scalding is practiced. In that case the birds are dipped quickly into hot water, sometimes alternating the dipping with cold water, and the birds while moist with the hot water are wrapped tightly for a few moments in cloth. The operation must be carefully done, so that the head will loosen the

feathers and yet not scald the skin so that it will break in picking. Experience is required to perform the operation successfully.

The bird to be killed is taken by the operator and held between his knees, the head resting in the left hand; a firm cross cut is then made in the upper and back part of the mouth, severing the main arteries of the head. The bird is then taken by the legs, and a quick, sharp blow on the head with a flat paddle, made from some hard wood, stuns the bird. Picking begins immediately. The operator sits in a chair beside the box, with the bird back down across his knees, the head being firmly held between the knee and the side of the box. The feathers are first removed from the under part of the bird, beginning at the abdomen and working toward the breast. All the feathers should be removed as the work progresses, excepting possibly a few pin feathers, which will have to be taken out later with a knife. The down can be best removed by wetting the hand and passing it quickly over the skin of the bird.

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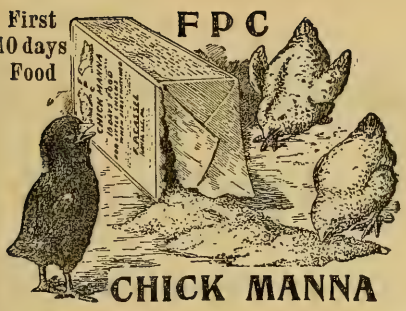

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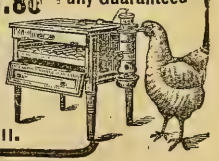

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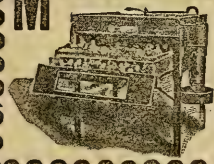

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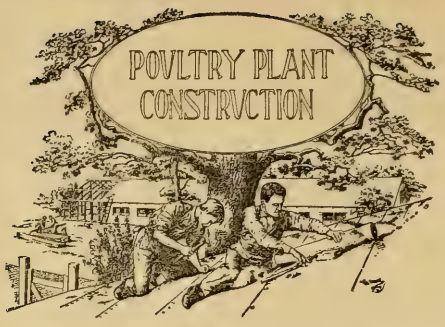

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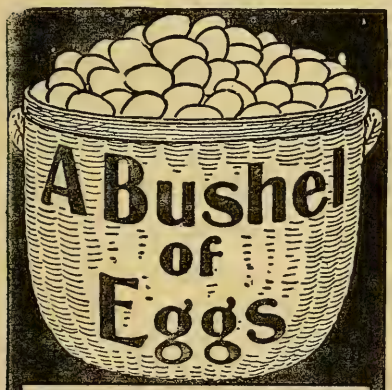

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